

# SEQUENCE LISTING

<110> OLSON, ERIC N.  
WANG, DA-ZHI

<120> METHODS AND COMPOSITIONS RELATING TO A CARDIAC-SPECIFIC  
NUCLEAR REGULATORY FACTOR

<130> UTSD:695US

<140> UNKNOWN

<141> 2001-12-21

<150> 60/257,761

<151> 2000-12-21

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<170> PatentIn Ver. 2.1

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<211> 4959

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<120> METHODS AND COMPOSITIONS RELATING TO A CARDIAC-SPECIFIC  
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<130> UTSD:695US

<140> UNKNOWN

<141> 2001-12-14

<150> 60/257,761

<151> 2000-12-21

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<170> PatentIn Ver. 2.1

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Arg Arg Ser Leu Glu Arg Ala Arg Thr Glu Asp Tyr Leu Lys Arg Lys	
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att cgt tcc cgg ccg gag aga tcg gag ctg gtc agg atg cac att ttg	145
Ile Arg Ser Arg Pro Glu Arg Ser Glu Leu Val Arg Met His Ile Leu	
35 40 45	
gaa gag acc tcg gct gag cca tcc ctc cag gcc aag cag ctg aag ctg	193
Glu Glu Thr Ser Ala Glu Pro Ser Leu Gln Ala Lys Gln Leu Lys Leu	
50 55 60	
aag aga gcc aga cta gcc gat gac ctc aat gag aag att gca cag agg	241
Lys Arg Ala Arg Leu Ala Asp Asp Leu Asn Glu Lys Ile Ala Gln Arg	
65 70 75	
cct ggc ccc atg gag ctg gtg gag aag aac atc ctt cct gtt gag tcc	289
Pro Gly Pro Met Glu Leu Val Glu Lys Asn Ile Leu Pro Val Glu Ser	
80 85 90 95	
agc ctg aag gaa gcc atc att gtg ggc cag gtg aac tat ccc aaa gta	337
Ser Leu Lys Glu Ala Ile Ile Val Gly Gln Val Asn Tyr Pro Lys Val	
100 105 110	
gca gac agc tct tcc ttc gat gag gac agc agc gat gcc tta tcc ccc	385
Ala Asp Ser Ser Ser Phe Asp Glu Asp Ser Ser Asp Ala Leu Ser Pro	
115 120 125	
gag cag cct gcc agc cat gag tcc cag ggt tct gtg ccg tca ccc ctg	433
Glu Gln Pro Ala Ser His Glu Ser Gln Gly Ser Val Pro Ser Pro Leu	
130 135 140	
gag gcc cga gtc agc gaa cca ctg ctc agt gcc acc tct gca tcc ccc	481
Glu Ala Arg Val Ser Glu Pro Leu Leu Ser Ala Thr Ser Ala Ser Pro	
145 150 155	
acc cag gtt gtg tct caa ctt ccg atg ggc cgg gat tcc aga gaa atg	529
Thr Gln Val Val Ser Gln Leu Pro Met Gly Arg Asp Ser Arg Glu Met	
160 165 170 175	
ctt ttc ctg gca gag cag cct cct ctg cct ccc cca cct ctg ctg cct	577
Leu Phe Leu Ala Glu Gln Pro Pro Leu Pro Pro Pro Pro Leu Leu Pro	
180 185 190	
ccc agc ctc acc aat gga acc act atc ccc act gcc aag tcc acc ccc	625

Pro	Ser	Leu	Thr	Asn	Gly	Thr	Thr	Ile	Pro	Thr	Ala	Lys	Ser	Thr	Pro		
			195					200					205				
aca	ctc	att	aag	caa	agc	caa	ccc	aag	tct	gcc	agt	gag	aag	tca	cag	673	
Thr	Leu	Ile	Lys	Gln	Ser	Gln	Pro	Lys	Ser	Ala	Ser	Glu	Lys	Ser	Gln		
		210					215					220					
cgc	agc	aag	aag	gcc	aag	gag	ctg	aag	cca	aag	gtg	aag	aag	ctc	aag	721	
Arg	Ser	Lys	Lys	Ala	Lys	Glu	Leu	Lys	Pro	Lys	Val	Lys	Lys	Leu	Lys		
	225					230					235						
tac	cac	cag	tac	atc	ccc	ccg	gac	cag	aag	cag	gac	agg	ggg	gca	ccc	769	
Tyr	His	Gln	Tyr	Ile	Pro	Pro	Asp	Gln	Lys	Gln	Asp	Arg	Gly	Ala	Pro		
240					245				250						255		
ccc	atg	gac	tca	tcc	tac	gcc	aag	atc	ctg	cag	cag	cag	cag	ctc	ttc	817	
Pro	Met	Asp	Ser	Ser	Tyr	Ala	Lys	Ile	Leu	Gln	Gln	Gln	Gln	Leu	Phe		
				260					265					270			
ctc	cag	ctg	cag	atc	ctc	aac	cag	cag	cag	cag	cag	cac	cac	aac	tac	865	
Leu	Gln	Leu	Gln	Ile	Leu	Asn	Gln	Gln	Gln	Gln	Gln	His	His	Asn	Tyr		
			275				280						285				
cag	gcc	atc	ctg	cct	gcc	ccg	cca	aag	tca	gca	ggc	gag	gcc	ctg	gga	913	
Gln	Ala	Ile	Leu	Pro	Ala	Pro	Pro	Lys	Ser	Ala	Gly	Glu	Ala	Leu	Gly		
		290					295					300					
agc	agc	ggg	acc	ccc	cca	gta	cgc	agc	ctc	tcc	act	acc	aat	agc	agc	961	
Ser	Ser	Gly	Thr	Pro	Pro	Val	Arg	Ser	Leu	Ser	Thr	Thr	Asn	Ser	Ser		
	305					310					315						
tcc	agc	tcg	ggc	gcc	cct	ggg	ccc	tgt	ggg	ctg	gca	cgt	cag	aac	agc	1009	
Ser	Ser	Ser	Gly	Ala	Pro	Gly	Pro	Cys	Gly	Leu	Ala	Arg	Gln	Asn	Ser		
320					325					330					335		
acc	tca	ctg	act	ggc	aag	ccg	gga	gcc	ctg	ccg	gcc	aac	ctg	gac	gac	1057	
Thr	Ser	Leu	Thr	Gly	Lys	Pro	Gly	Ala	Leu	Pro	Ala	Asn	Leu	Asp	Asp		
				340					345					350			
atg	aag	gtg	gca	gag	ctg	aag	cag	gag	ctg	aag	ttg	cga	tca	ctg	cct	1105	
Met	Lys	Val	Ala	Glu	Leu	Lys	Gln	Glu	Leu	Lys	Leu	Arg	Ser	Leu	Pro		
			355					360					365				
gtc	tcg	ggc	acc	aaa	act	gag	ctg	att	gag	cgc	ctt	cga	gcc	tat	caa	1153	
Val	Ser	Gly	Thr	Lys	Thr	Glu	Leu	Ile	Glu	Arg	Leu	Arg	Ala	Tyr	Gln		
		370					375					380					
gac	caa	atc	agc	cct	gtg	cca	gga	gcc	ccc	aag	gcc	cct	gcc	gcc	acc	1201	
Asp	Gln	Ile	Ser	Pro	Val	Pro	Gly	Ala	Pro	Lys	Ala	Pro	Ala	Ala	Thr		
	385					390					395						
tct	atc	ctg	cac	aag	gct	ggc	gag	gtg	gtg	gta	gcc	ttc	cca	gcg	gcc	1249	
Ser	Ile	Leu	His	Lys	Ala	Gly	Glu	Val	Val	Val	Ala	Phe	Pro	Ala	Ala		
400					405					410					415		

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cgg ctg agc acg ggg cca gcc ctg gtg gca gca ggc ctg gct cca gct	1297
Arg Leu Ser Thr Gly Pro Ala Leu Val Ala Ala Gly Leu Ala Pro Ala	
420 425 430	
gag gtg gtg gtg gcc acg gtg gcc agc agt ggg gtg gtg aag ttt ggc	1345
Glu Val Val Val Ala Thr Val Ala Ser Ser Gly Val Val Lys Phe Gly	
435 440 445	
agc acg ggc tcc acg ccc ccc gtg tct ccc acc ccc tcg gag cgc tca	1393
Ser Thr Gly Ser Thr Pro Pro Val Ser Pro Thr Pro Ser Glu Arg Ser	
450 455 460	
ctg ctc agc acg ggc gat gaa aac tcc acc ccc ggg gac acc ttt ggt	1441
Leu Leu Ser Thr Gly Asp Glu Asn Ser Thr Pro Gly Asp Thr Phe Gly	
465 470 475	
gag atg gtg aca tca cct ctg acg cag ctg acc ctg cag gcc tcg cca	1489
Glu Met Val Thr Ser Pro Leu Thr Gln Leu Thr Leu Gln Ala Ser Pro	
480 485 490 495	
ctg cag atc ctc gtg aag gag gag ggc ccc cgg gcc ggg tcc tgt tgc	1537
Leu Gln Ile Leu Val Lys Glu Glu Gly Pro Arg Ala Gly Ser Cys Cys	
500 505 510	
ctg agc cct ggg ggg cgg gcg gag cta gag ggg cgc gac aag gac cag	1585
Leu Ser Pro Gly Gly Arg Ala Glu Leu Glu Gly Arg Asp Lys Asp Gln	
515 520 525	
atg ctg cag gag aaa gac aag cag atc gag gcg ctg acg cgc atg ctc	1633
Met Leu Gln Glu Lys Asp Lys Gln Ile Glu Ala Leu Thr Arg Met Leu	
530 535 540	
cgg cag aag cag cag ctg gtg gag cgg ctc aag ctg cag ctg gag cag	1681
Arg Gln Lys Gln Gln Leu Val Glu Arg Leu Lys Leu Gln Leu Glu Gln	
545 550 555	
gag aag cga gcc cag cag ccc gcc ccc gcc ccc gcc ccc ctc ggc acc	1729
Glu Lys Arg Ala Gln Gln Pro Ala Pro Ala Pro Ala Pro Leu Gly Thr	
560 565 570 575	
ccc gtg aag cag gag aac agc ttc tcc agc tgc cag ctg agc cag cag	1777
Pro Val Lys Gln Glu Asn Ser Phe Ser Ser Cys Gln Leu Ser Gln Gln	
580 585 590	
ccc ctg ggc ccc gct cac cca ttc aac ccc agc ctg gcg gcc cca gcc	1825
Pro Leu Gly Pro Ala His Pro Phe Asn Pro Ser Leu Ala Ala Pro Ala	
595 600 605	
acc aac cac ata gac cct tgt gct gtg gcc ccg ggg ccc ccg tcc gtg	1873
Thr Asn His Ile Asp Pro Cys Ala Val Ala Pro Gly Pro Pro Ser Val	
610 615 620	
gtg gtg aag cag gaa gcc ttg cag cct gag ccc gag ccg gtc ccc gcc	1921

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<213> Mus musculus

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Arg	Ser	Arg	Pro	Glu	Arg	Ser	Glu	Leu	Val	Arg	Met	His	Ile	Leu	Glu
	35						40					45			
Glu	Thr	Ser	Ala	Glu	Pro	Ser	Leu	Gln	Ala	Lys	Gln	Leu	Lys	Leu	Lys
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	65				70					75					80
Gly	Pro	Met	Glu	Leu	Val	Glu	Lys	Asn	Ile	Leu	Pro	Val	Glu	Ser	Ser
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Asp	Ser	Ser	Ser	Phe	Asp	Glu	Asp	Ser	Ser	Asp	Ala	Leu	Ser	Pro	Glu

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Phe Leu Ala Glu Gln Pro Pro Leu Pro Pro Pro Pro Leu Leu Pro Pro 180 185 190		
Ser Leu Thr Asn Gly Thr Thr Ile Pro Thr Ala Lys Ser Thr Pro Thr 195 200 205		
Leu Ile Lys Gln Ser Gln Pro Lys Ser Ala Ser Glu Lys Ser Gln Arg 210 215 220		
Ser Lys Lys Ala Lys Glu Leu Lys Pro Lys Val Lys Lys Leu Lys Tyr 225 230 235 240		
His Gln Tyr Ile Pro Pro Asp Gln Lys Gln Asp Arg Gly Ala Pro Pro 245 250 255		
Met Asp Ser Ser Tyr Ala Lys Ile Leu Gln Gln Gln Gln Leu Phe Leu 260 265 270		
Gln Leu Gln Ile Leu Asn Gln Gln Gln Gln Gln His His Asn Tyr Gln 275 280 285		
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Ser Ser Gly Ala Pro Gly Pro Cys Gly Leu Ala Arg Gln Asn Ser Thr 325 330 335		
Ser Leu Thr Gly Lys Pro Gly Ala Leu Pro Ala Asn Leu Asp Asp Met 340 345 350		
Lys Val Ala Glu Leu Lys Gln Glu Leu Lys Leu Arg Ser Leu Pro Val 355 360 365		
Ser Gly Thr Lys Thr Glu Leu Ile Glu Arg Leu Arg Ala Tyr Gln Asp 370 375 380		
Gln Ile Ser Pro Val Pro Gly Ala Pro Lys Ala Pro Ala Ala Thr Ser 385 390 395 400		
Ile Leu His Lys Ala Gly Glu Val Val Val Ala Phe Pro Ala Ala Arg		

115 120 125  
 130 135 140  
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 210 215 220  
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&lt;210&gt; 5

&lt;211&gt; 35

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 5

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Asn Leu Pro Val Ser Gly Pro Lys Pro His Leu Ile Glu Arg Leu Lys  
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Pro Tyr Leu  
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&lt;210&gt; 6

&lt;211&gt; 6459

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;220&gt;

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&lt;222&gt; (1)..(1053)

&lt;400&gt; 6

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gct gca caa ata cca act gct gcc ttg gcc tca ggc ttg gcc cca act 96  
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gta cct cag aca caa gac acg ttc ccg cag cat gtg ctc agt cag cct 144  
 Val Pro Gln Thr Gln Asp Thr Phe Pro Gln His Val Leu Ser Gln Pro  
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caa caa gtc aga aag gtt ttc aca aac tca gca tca tca aat aca gtt 192  
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ctt cca tat cag aga cat cct gcc cca gct gtc cag cag ccc ttt atc 240  
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aat aag gcc tcc aac agt gtt ctt caa tcc aga aat gct ccg ctt cca 288  
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tcc ctg caa aat gga cct aac aca ccc aac aag cct agt tca ccc ccg	336
Ser Leu Gln Asn Gly Pro Asn Thr Pro Asn Lys Pro Ser Ser Pro Pro	
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Pro Pro Gln Gln Phe Val Val Gln His Ser Leu Phe Gly Ser Pro Val	
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gcc aag aca aaa gat ccc ccc cgc tat gag gag gcc atc aag cag aca	432
Ala Lys Thr Lys Asp Pro Pro Arg Tyr Glu Glu Ala Ile Lys Gln Thr	
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cgc agc aca cag gcc cct ctg cca gag att tcc aac gct cac agt cag	480
Arg Ser Thr Gln Ala Pro Leu Pro Glu Ile Ser Asn Ala His Ser Gln	
145 150 155 160	
cag atg gat gac ctc ttt gat atc ctc att aag agt gga gag atc tcc	528
Gln Met Asp Asp Leu Phe Asp Ile Leu Ile Lys Ser Gly Glu Ile Ser	
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Leu Pro Ile Lys Glu Glu Pro Ser Pro Ile Ser Lys Met Arg Pro Val	
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aca gcc agc atc acc aca atg cca gtg aat aca gtg gtg tcc cgg cca	624
Thr Ala Ser Ile Thr Thr Met Pro Val Asn Thr Val Val Ser Arg Pro	
195 200 205	
cca ccc caa gtc caa atg gca cca cct gta tct tta gaa cct atg ggc	672
Pro Pro Gln Val Gln Met Ala Pro Pro Val Ser Leu Glu Pro Met Gly	
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Ser Leu Ser Ala Ser Leu Glu Asn Gln Leu Glu Ala Phe Leu Asp Gly	
225 230 235 240	
act tta ccc tca gcc aat gaa att cct cca cta caa agc agc agt gaa	768
Thr Leu Pro Ser Ala Asn Glu Ile Pro Pro Leu Gln Ser Ser Ser Glu	
245 250 255	
gac aga gag ccc ttc tct ctg atc gag gac ctc cag aat gat ctg ctg	816
Asp Arg Glu Pro Phe Ser Leu Ile Glu Asp Leu Gln Asn Asp Leu Leu	
260 265 270	
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Ser His Ser Gly Met Leu Asp His Ser His Ser Pro Met Glu Thr Ser	
275 280 285	
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Glu Thr Gln Phe Ala Ala Gly Thr Pro Cys Leu Ser Leu Asp Leu Ser	
290 295 300	
gac tca aac ttg gac aac atg gag tgg ttg gac att acc atg ccc aac	960
Asp Ser Asn Leu Asp Asn Met Glu Trp Leu Asp Ile Thr Met Pro Asn	

100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300









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Val	Pro	Gln	Thr	Gln	Asp	Thr	Phe	Pro	Gln	His	Val	Leu	Ser	Gln	Pro
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Gln	Gln	Val	Arg	Lys	Val	Phe	Thr	Asn	Ser	Ala	Ser	Ser	Asn	Thr	Val
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Leu	Pro	Tyr	Gln	Arg	His	Pro	Ala	Pro	Ala	Val	Gln	Gln	Pro	Phe	Ile
			65			70				75					80
Asn	Lys	Ala	Ser	Asn	Ser	Val	Leu	Gln	Ser	Arg	Asn	Ala	Pro	Leu	Pro
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Ser Leu Gln Asn Gly Pro Asn Thr Pro Asn Lys Pro Ser Ser Pro Pro  
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Pro Pro Gln Gln Phe Val Val Gln His Ser Leu Phe Gly Ser Pro Val  
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Ala Lys Thr Lys Asp Pro Pro Arg Tyr Glu Glu Ala Ile Lys Gln Thr  
 130 135 140

Arg Ser Thr Gln Ala Pro Leu Pro Glu Ile Ser Asn Ala His Ser Gln  
 145 150 155 160

Gln Met Asp Asp Leu Phe Asp Ile Leu Ile Lys Ser Gly Glu Ile Ser  
 165 170 175

Leu Pro Ile Lys Glu Glu Pro Ser Pro Ile Ser Lys Met Arg Pro Val  
 180 185 190

Thr Ala Ser Ile Thr Thr Met Pro Val Asn Thr Val Val Ser Arg Pro  
 195 200 205

Pro Pro Gln Val Gln Met Ala Pro Pro Val Ser Leu Glu Pro Met Gly  
 210 215 220

Ser Leu Ser Ala Ser Leu Glu Asn Gln Leu Glu Ala Phe Leu Asp Gly  
 225 230 235 240

Thr Leu Pro Ser Ala Asn Glu Ile Pro Pro Leu Gln Ser Ser Ser Glu  
 245 250 255

Asp Arg Glu Pro Phe Ser Leu Ile Glu Asp Leu Gln Asn Asp Leu Leu  
 260 265 270

Ser His Ser Gly Met Leu Asp His Ser His Ser Pro Met Glu Thr Ser  
 275 280 285

Glu Thr Gln Phe Ala Ala Gly Thr Pro Cys Leu Ser Leu Asp Leu Ser  
 290 295 300

Asp Ser Asn Leu Asp Asn Met Glu Trp Leu Asp Ile Thr Met Pro Asn  
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Ala Tyr Gln  
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Gly Ala Gly Ala Ala Gly Gly Ala Gly Cys Thr Thr Gly Gly Ala Gly  
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Cys Gly Gly Gly Cys Cys Ala Gly Gly Ala Cys Ala Gly Ala Gly Gly  
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 Ala Cys Thr Ala Thr Cys Thr Cys Ala Ala Ala Cys Gly Gly Ala Ala  
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Ser	Thr	Pro	Ile	Pro	Val	His	Thr	Ala	Val	Lys	Ser	Lys	Ser	Leu	Gly		
100								105				110					
gac	agt	aag	aac	cgc	cac	aaa	aag	ccc	aaa	gac	ccc	aaa	cca	aag	gtg	384	
Asp	Ser	Lys	Asn	Arg	His	Lys	Lys	Pro	Lys	Asp	Pro	Lys	Pro	Lys	Val		
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Lys	Lys	Leu	Lys	Tyr	His	Gln	Tyr	Ile	Pro	Pro	Asp	Gln	Lys	Ala	Glu		
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Asn	Ser	Pro	Pro	Pro	Met	Asp	Ser	Ala	Tyr	Ala	Arg	Leu	Leu	Gln	Gln		
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cag	cag	cta	ttc	ctg	cag	cta	cag	atc	ctc	agc	cag	cag	cag	caa	cag	528	
Gln	Gln	Leu	Phe	Leu	Gln	Leu	Gln	Ile	Leu	Ser	Gln	Gln	Gln	Gln	Gln		
165								170				175					
cag	cag	caa	cag	cag	cag	cag	caa	cag	cag	cag	cag	cag	cag	cag	cag	576	
Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln		
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cgg	ttc	agc	tac	cct	ggg	atg	cac	caa	aca	cac	ctc	aaa	gaa	cca	aat	624	
Arg	Phe	Ser	Tyr	Pro	Gly	Met	His	Gln	Thr	His	Leu	Lys	Glu	Pro	Asn		
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gaa	cag	atg	gcc	aga	aat	ccg	aat	cct	tct	tca	aca	cca	ctg	agc	aat	672	
Glu	Gln	Met	Ala	Arg	Asn	Pro	Asn	Pro	Ser	Ser	Thr	Pro	Leu	Ser	Asn		
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Thr	Pro	Leu	Ser	Pro	Val	Lys	Asn	Xaa	Ile	Ser	Gly	Gln	Thr	Gly	Val		
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Ser	Ser	Leu	Lys	Pro	Gly	Pro	Leu	Pro	Pro	Asn	Leu	Asp	Asp	Leu	Lys		
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Val	Ser	Glu	Leu	Arg	Gln	Gln	Leu	Arg	Ile	Arg	Gly	Leu	Pro	Val	Ser		
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ggc	acc	aag	aca	gcg	ctg	gtg	gac	cgg	ctt	cgt	ccc	ttc	cag	gat	tgt	864	
Gly	Thr	Lys	Thr	Ala	Leu	Val	Asp	Arg	Leu	Arg	Pro	Phe	Gln	Asp	Cys		
275								280				285					
gct	ggc	aac	cct	gtg	ccc	aac	ttt	ggg	gac	atc	aca	act	gtc	acc	ttt	912	
Ala	Gly	Asn	Pro	Val	Pro	Asn	Phe	Gly	Asp	Ile	Thr	Thr	Val	Thr	Phe		
290								295				300					



cct gtc acg ccc aac acc ttg ccc agt tat cag tcc tcc ccg aca ggc	960
Pro Val Thr Pro Asn Thr Leu Pro Ser Tyr Gln Ser Ser Pro Thr Gly	
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ttc tac cac ttt ggc agc aca agc tcc agc cca ccc atc tcc ccc gcc	1008
Phe Tyr His Phe Gly Ser Thr Ser Ser Ser Pro Pro Ile Ser Pro Ala	
325 330 335	
tca tct gac ttg tcc gct gca ggg tcc ctg cca gac acc ttc acc gat	1056
Ser Ser Asp Leu Ser Ala Ala Gly Ser Leu Pro Asp Thr Phe Thr Asp	
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gcg tca cct ggc ttc ggc ctg cac gca tct ccg gtg ccc gcc tgc acg	1104
Ala Ser Pro Gly Phe Gly Leu His Ala Ser Pro Val Pro Ala Cys Thr	
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gac gag agt ctg ctg agc agc ctg aat ggg ggc tcg ggc ccc tcc gag	1152
Asp Glu Ser Leu Leu Ser Ser Leu Asn Gly Gly Ser Gly Pro Ser Glu	
370 375 380	
cct gat ggg cta gac tct gag aag gac aag atg ctg gtg gag aag cag	1200
Pro Asp Gly Leu Asp Ser Glu Lys Asp Lys Met Leu Val Glu Lys Gln	
385 390 395 400	
aaa gtg atc aac cag ctc acc tgg aag ctg cgg caa gag cag cgg cag	1248
Lys Val Ile Asn Gln Leu Thr Trp Lys Leu Arg Gln Glu Gln Arg Gln	
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Val Glu Glu Leu Arg Met Gln Leu Gln Lys Gln Lys Ser Ser Cys Ser	
420 425 430	
gac cag aag cca ctc ccc ttc ttg gcc acc acc atc aaa cag gaa gat	1344
Asp Gln Lys Pro Leu Pro Phe Leu Ala Thr Thr Ile Lys Gln Glu Asp	
435 440 445	
gtc tcc agc tgc ccc ttc gca ccc cag cag gcg tct ggg aag gga cag	1392
Val Ser Ser Cys Pro Phe Ala Pro Gln Gln Ala Ser Gly Lys Gly Gln	
450 455 460	
ggc cac agc tct gac agt ccc cct ccg gct tgt gag acg gct cag ctg	1440
Gly His Ser Ser Asp Ser Pro Pro Pro Ala Cys Glu Thr Ala Gln Leu	
465 470 475 480	
ctg cct cac tgt gtg gag tcc tca ggt caa acc cat gta ctc tcg tcc	1488
Leu Pro His Cys Val Glu Ser Ser Gly Gln Thr His Val Leu Ser Ser	
485 490 495	
acg ttt ctc agc ccc cag tgc tcc cct cag cac tcg ccc cgt ggg ggc	1536
Thr Phe Leu Ser Pro Gln Cys Ser Pro Gln His Ser Pro Arg Gly Gly	
500 505 510	
ctg aag agc ccg cag cac atc agc ctg cct cca tca ccc aac aac cat	1584

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Leu	Lys	Ser	Pro	Gln	His	Ile	Ser	Leu	Pro	Pro	Ser	Pro	Asn	Asn	His		
		515					520					525					
tac	ttc	ctg	gct	tcc	tct	tcg	gga	gct	cag	aga	gag	aac	cat	ggg	gtc	1632	
Tyr	Phe	Leu	Ala	Ser	Ser	Ser	Gly	Ala	Gln	Arg	Glu	Asn	His	Gly	Val		
	530					535					540						
tct	tca	ccc	agc	agc	agc	caa	ggg	tgc	gca	cag	atg	act	ggg	tta	caa	1680	
Ser	Ser	Pro	Ser	Ser	Ser	Gln	Gly	Cys	Ala	Gln	Met	Thr	Gly	Leu	Gln		
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Ser	Ser	Asp	Lys	Val	Gly	Pro	Thr	Phe	Ser	Ile	Pro	Ser	Pro	Thr	Phe		
				565				570						575			
tct	aag	tca	agt	tca	gca	gtt	tca	gat	atc	acc	cag	ccc	cca	tcc	tat	1776	
Ser	Lys	Ser	Ser	Ser	Ala	Val	Ser	Asp	Ile	Thr	Gln	Pro	Pro	Ser	Tyr		
			580				585						590				
gaa	gat	gca	gtg	aag	cag	caa	atg	act	cgg	agt	cag	cag	atg	gac	gaa	1824	
Glu	Asp	Ala	Val	Lys	Gln	Gln	Met	Thr	Arg	Ser	Gln	Gln	Met	Asp	Glu		
		595				600						605					
ctc	ctg	gat	gtc	ctc	att	gaa	agt	gga	gaa	atg	cca	gcc	gat	gcc	agg	1872	
Leu	Leu	Asp	Val	Leu	Ile	Glu	Ser	Gly	Glu	Met	Pro	Ala	Asp	Ala	Arg		
	610					615					620						
gaa	gat	cat	tca	tgt	ctt	cag	aaa	att	cca	aag	atc	cct	ggg	tcc	tcc	1920	
Glu	Asp	His	Ser	Cys	Leu	Gln	Lys	Ile	Pro	Lys	Ile	Pro	Gly	Ser	Ser		
625					630				635						640		
tgc	agc	cca	act	gcc	atc	ccc	ccg	aag	ccc	tcg	gct	tcc	ttt	gag	cag	1968	
Cys	Ser	Pro	Thr	Ala	Ile	Pro	Pro	Lys	Pro	Ser	Ala	Ser	Phe	Glu	Gln		
				645				650						655			
gca	tct	tcg	gga	ggc	cag	atg	gcc	ttc	gat	cac	tac	gca	aac	gac	agt	2016	
Ala	Ser	Ser	Gly	Gly	Gln	Met	Ala	Phe	Asp	His	Tyr	Ala	Asn	Asp	Ser		
			660				665						670				
gac	gaa	cac	ctg	gaa	gtc	tta	ttg	aat	tct	cac	agc	ccc	atc	gga	aag	2064	
Asp	Glu	His	Leu	Glu	Val	Leu	Leu	Asn	Ser	His	Ser	Pro	Ile	Gly	Lys		
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gtg	agc	gat	gtt	acc	ctc	ctc	aaa	atc	gga	agc	gag	gag	cct	cct	ttt	2112	
Val	Ser	Asp	Val	Thr	Leu	Leu	Lys	Ile	Gly	Ser	Glu	Glu	Pro	Pro	Phe		
		690				695					700						
gac	agc	atc	atg	gat	ggc	ttc	cca	ggg	aag	gct	gcg	gaa	gat	ctc	ttc	2160	
Asp	Ser	Ile	Met	Asp	Gly	Phe	Pro	Gly	Lys	Ala	Ala	Glu	Asp	Leu	Phe		
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			165					170						175			
Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln	Gln		
			180					185					190				
Arg	Phe	Ser	Tyr	Pro	Gly	Met	His	Gln	Thr	His	Leu	Lys	Glu	Pro	Asn		
	195					200						205					
Glu	Gln	Met	Ala	Arg	Asn	Pro	Asn	Pro	Ser	Ser	Thr	Pro	Leu	Ser	Asn		
	210					215					220						
Thr	Pro	Leu	Ser	Pro	Val	Lys	Asn	Xaa	Ile	Ser	Gly	Gln	Thr	Gly	Val		
225					230					235					240		
Ser	Ser	Leu	Lys	Pro	Gly	Pro	Leu	Pro	Pro	Asn	Leu	Asp	Asp	Leu	Lys		
				245					250					255			
Val	Ser	Glu	Leu	Arg	Gln	Gln	Leu	Arg	Ile	Arg	Gly	Leu	Pro	Val	Ser		
			260					265					270				
Gly	Thr	Lys	Thr	Ala	Leu	Val	Asp	Arg	Leu	Arg	Pro	Phe	Gln	Asp	Cys		
		275					280					285					
Ala	Gly	Asn	Pro	Val	Pro	Asn	Phe	Gly	Asp	Ile	Thr	Thr	Val	Thr	Phe		
	290					295					300						
Pro	Val	Thr	Pro	Asn	Thr	Leu	Pro	Ser	Tyr	Gln	Ser	Ser	Pro	Thr	Gly		
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Phe	Tyr	His	Phe	Gly	Ser	Thr	Ser	Ser	Ser	Pro	Pro	Ile	Ser	Pro	Ala		
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Ser	Ser	Asp	Leu	Ser	Ala	Ala	Gly	Ser	Leu	Pro	Asp	Thr	Phe	Thr	Asp		
			340					345					350				
Ala	Ser	Pro	Gly	Phe	Gly	Leu	His	Ala	Ser	Pro	Val	Pro	Ala	Cys	Thr		
		355					360					365					
Asp	Glu	Ser	Leu	Leu	Ser	Ser	Leu	Asn	Gly	Gly	Ser	Gly	Pro	Ser	Glu		
	370					375					380						
Pro	Asp	Gly	Leu	Asp	Ser	Glu	Lys	Asp	Lys	Met	Leu	Val	Glu	Lys	Gln		
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Lys	Val	Ile	Asn	Gln	Leu	Thr	Trp	Lys	Leu	Arg	Gln	Glu	Gln	Arg	Gln		
			405					410						415			
Val	Glu	Glu	Leu	Arg	Met	Gln	Leu	Gln	Lys	Gln	Lys	Ser	Ser	Cys	Ser		
			420				425						430				

145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430

Asp Gln Lys Pro Leu Pro Phe Leu Ala Thr Thr Ile Lys Gln Glu Asp  
435 440 445

Val Ser Ser Cys Pro Phe Ala Pro Gln Gln Ala Ser Gly Lys Gly Gln  
450 455 460

Gly His Ser Ser Asp Ser Pro Pro Pro Ala Cys Glu Thr Ala Gln Leu  
465 470 475 480

Leu Pro His Cys Val Glu Ser Ser Gly Gln Thr His Val Leu Ser Ser  
485 490 495

Thr Phe Leu Ser Pro Gln Cys Ser Pro Gln His Ser Pro Arg Gly Gly  
500 505 510

Leu Lys Ser Pro Gln His Ile Ser Leu Pro Pro Ser Pro Asn Asn His  
515 520 525

Tyr Phe Leu Ala Ser Ser Ser Gly Ala Gln Arg Glu Asn His Gly Val  
530 535 540

Ser Ser Pro Ser Ser Ser Gln Gly Cys Ala Gln Met Thr Gly Leu Gln  
545 550 555 560

Ser Ser Asp Lys Val Gly Pro Thr Phe Ser Ile Pro Ser Pro Thr Phe  
565 570 575

Ser Lys Ser Ser Ser Ala Val Ser Asp Ile Thr Gln Pro Pro Ser Tyr  
580 585 590

Glu Asp Ala Val Lys Gln Gln Met Thr Arg Ser Gln Gln Met Asp Glu  
595 600 605

Leu Leu Asp Val Leu Ile Glu Ser Gly Glu Met Pro Ala Asp Ala Arg  
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Glu Asp His Ser Cys Leu Gln Lys Ile Pro Lys Ile Pro Gly Ser Ser  
625 630 635 640

Cys Ser Pro Thr Ala Ile Pro Pro Lys Pro Ser Ala Ser Phe Glu Gln  
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Ala Ser Ser Gly Gly Gln Met Ala Phe Asp His Tyr Ala Asn Asp Ser  
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Asp Glu His Leu Glu Val Leu Leu Asn Ser His Ser Pro Ile Gly Lys  
675 680 685

Val Ser Asp Val Thr Leu Leu Lys Ile Gly Ser Glu Glu Pro Pro Phe  
690 695 700

Asp Ser Ile Met Asp Gly Phe Pro Gly Lys Ala Ala Glu Asp Leu Phe  
705 710 715 720

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Ser Ala His Glu Leu Leu Pro Gly Pro Leu Ser Pro Met His Ala Gln  
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Leu Ser Pro Pro Ser Val Asp Ser Ser Gly Leu Gln Leu Ser Leu Pro  
740 745 750

Glu Ser Pro Trp Glu Thr Met Glu Trp Leu Asp Leu Thr Pro Pro Ser  
755 760 765

Ser Thr Pro Gly Phe Ser Asn Leu Thr Ser Ser Gly Pro Ser Ile Phe  
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Asn Ile Asp Phe Leu Asp Val Thr Asp Leu Asn Leu Asn Ser Pro Met  
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Asp Leu His Leu Gln Gln Trp  
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ggagctcacg gagagttgga tgaattctgg gttgttagct gcggtcagct gggctcccg 180

gagcctgttg ctggtggaga acagggggcg cctggccaag ggaccagcgg cttgctgaga 240

ctcaac atg aca ctc ctg ggg tct gag cat tcc ttg ctg att agg agc 288

Met Thr Leu Leu Gly Ser Glu His Ser Leu Leu Ile Arg Ser  
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aag ttc aga tca gtt tta cag tta aga ctt caa caa aga agg acc cag 336

Lys Phe Arg Ser Val Leu Gln Leu Arg Leu Gln Gln Arg Arg Thr Gln  
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Glu Gln Leu Ala Asn Gln Gly Ile Ile Pro Leu Lys Arg Pro Ala  
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gaa ttc cat gag caa aga aaa cat ttg gat agt gac aag gct aaa aat 432

Glu Phe His Glu Gln Arg Lys His Leu Asp Ser Asp Lys Ala Lys Asn  
50 55 60

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Met Thr Leu Leu Gly Ser Glu His Ser Leu Leu Ile Arg Ser  
1 5 10  
aag ttc aga tca gtt tta cag tta aga ctt caa caa aga agg acc cag 336  
Lys Phe Arg Ser Val Leu Gln Leu Arg Leu Gln Gln Arg Arg Thr Gln  
15 20 25 30  
gaa caa ctg gct aac caa ggc ata ata cca cca ctg aaa cgt cca gct 384  
Glu Gln Leu Ala Asn Gln Gly Ile Ile Pro Leu Lys Arg Pro Ala  
35 40 45  
gaa ttc cat gag caa aga aaa cat ttg gat agt gac aag gct aaa aat 432  
Glu Phe His Glu Gln Arg Lys His Leu Asp Ser Asp Lys Ala Lys Asn  
50 55 60



Pro	Asp	Gln	Lys	Ala	Glu	Lys	Ser	Pro	Pro	Pro	Met	Asp	Ser	Ala	Tyr		
				275					280					285			
gct	cgg	ctg	ctc	cag	caa	cag	cag	ctg	ttc	ctg	cag	ctc	caa	atc	ctc	1152	
Ala	Arg	Leu	Leu	Gln	Gln	Gln	Gln	Leu	Phe	Leu	Gln	Leu	Gln	Ile	Leu		
				290					295					300			
agc	cag	cag	cag	cag	cag	cag	caa	cac	cga	ttc	agc	tac	cta	ggg	atg	1200	
Ser	Gln	Gln	Gln	Gln	Gln	Gln	Gln	His	Arg	Phe	Ser	Tyr	Leu	Gly	Met		
				305					310					315			
cac	caa	gct	cag	ctt	aag	gaa	cca	aat	gaa	cag	atg	gtc	aga	aat	cca	1248	
His	Gln	Ala	Gln	Leu	Lys	Glu	Pro	Asn	Glu	Gln	Met	Val	Arg	Asn	Pro		
				320					325					330			
aac	tct	tct	tca	acg	cca	ctg	agc	aat	acc	ccc	ttg	tct	cct	gtc	aaa	1296	
Asn	Ser	Ser	Ser	Thr	Pro	Leu	Ser	Asn	Thr	Pro	Leu	Ser	Pro	Val	Lys		
				335					340					345			350
aac	agt	ttt	tct	gga	caa	act	ggg	gtc	tct	tct	ttc	aaa	cca	ggc	cca	1344	
Asn	Ser	Phe	Ser	Gly	Gln	Thr	Gly	Val	Ser	Ser	Phe	Lys	Pro	Gly	Pro		
				355					360					365			
ctc	cca	cct	aac	ctg	gat	gat	ctg	aag	gtc	tct	gaa	tta	aga	caa	cag	1392	
Leu	Pro	Pro	Asn	Leu	Asp	Asp	Leu	Lys	Val	Ser	Glu	Leu	Arg	Gln	Gln		
				370					375					380			
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Leu	Arg	Ile	Arg	Gly	Leu	Pro	Val	Ser	Gly	Thr	Lys	Thr	Ala	Leu	Met		
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gac	cgg	ctt	cga	ccc	ttc	cag	gac	tgc	tct	ggc	aac	cca	gtg	ccg	aac	1488	
Asp	Arg	Leu	Arg	Pro	Phe	Gln	Asp	Cys	Ser	Gly	Asn	Pro	Val	Pro	Asn		
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ttt	ggg	gat	ata	acg	act	gtc	act	ttt	cct	gtc	aca	ccc	aac	acg	ctg	1536	
Phe	Gly	Asp	Ile	Thr	Thr	Val	Thr	Phe	Pro	Val	Thr	Pro	Asn	Thr	Leu		
				415					420					425			430
ccc	aat	tac	cag	tct	tcc	tct	tct	acc	agt	gcc	ctg	tcc	aac	ggc	ttc	1584	
Pro	Asn	Tyr	Gln	Ser	Ser	Ser	Ser	Thr	Ser	Ala	Leu	Ser	Asn	Gly	Phe		
				435					440					445			
tac	cac	ttt	ggc	agc	acc	agc	tcc	agc	ccc	ccg	atc	tcc	cca	gcc	tcc	1632	
Tyr	His	Phe	Gly	Ser	Thr	Ser	Ser	Ser	Pro	Pro	Ile	Ser	Pro	Ala	Ser		
				450					455					460			
tct	gac	ctg	tca	gtc	gct	ggg	tcc	ctg	ccg	gac	acc	ttc	aat	gat	gcc	1680	
Ser	Asp	Leu	Ser	Val	Ala	Gly	Ser	Leu	Pro	Asp	Thr	Phe	Asn	Asp	Ala		
				465					470					475			
tcc	ccc	tcc	ttc	ggc	ctg	cac	ccg	tcc	cca	gtc	cac	gtg	tgc	acg	gag	1728	
Ser	Pro	Ser	Phe	Gly	Leu	His	Pro	Ser	Pro	Val	His	Val	Cys	Thr	Glu		
				480					485					490			



gaa Glu 495	agt Ser	ctc Leu	atg Met	agc Ser	agc Ser	ctg Leu	aat Asn	ggg Gly	ggc Gly	tct Ser	gtt Val	cct Pro	tct Ser	gag Glu	ctg Leu	1776
gat ggg ctg gac tcc gag aag gac aag atg ctg gtg gag aag cag aag 1824																
Asp Gly Leu Asp Ser Glu Lys Asp Lys Met Leu Val Glu Lys Gln Lys 525																
gtg atc aat gaa ctc acc tgg aaa ctc cag caa gag cag agg cag gtg 1872																
Val Ile Asn Glu Leu Thr Trp Lys Leu Gln Gln Glu Gln Arg Gln Val 530 535 540																
gag gag ctg agg atg cag ctt cag aag cag aaa agg aat aac tgt tca 1920																
Glu Glu Leu Arg Met Gln Leu Gln Lys Gln Lys Arg Asn Asn Cys Ser 545 550 555																
gag aag aag ccg ctg cct ttc ctg gct gcc tcc atc aag cag gaa gag 1968																
Glu Lys Lys Pro Leu Pro Phe Leu Ala Ala Ser Ile Lys Gln Glu Glu 560 565 570																
gct gtc tcc agc tgt cct ttt gca tcc caa gta cct gtg aaa aga caa 2016																
Ala Val Ser Ser Cys Pro Phe Ala Ser Gln Val Pro Val Lys Arg Gln 575 580 585 590																
agc agc agc tca gag tgt cac cca ccg gct tgt gaa gct gct caa ctc 2064																
Ser Ser Ser Ser Glu Cys His Pro Pro Ala Cys Glu Ala Ala Gln Leu 595 600 605																
cag cct ctt gga aat gct cat tgt gtg gag tcc tca gat caa acc aat 2112																
Gln Pro Leu Gly Asn Ala His Cys Val Glu Ser Ser Asp Gln Thr Asn 610 615 620																
gta ctt tct tcc aca ttt ctc agc ccc cag tgt tcc cct cag cat tca 2160																
Val Leu Ser Ser Thr Phe Leu Ser Pro Gln Cys Ser Pro Gln His Ser 625 630 635																
ccg ctg ggg gct gtg aaa agc cca cag cac atc agt ttg ccc cca tca 2208																
Pro Leu Gly Ala Val Lys Ser Pro Gln His Ile Ser Leu Pro Pro Ser 640 645 650																
ccc aac aac cct cac ttt ctg ccc tca tcc tcc ggg gcc cag gga gaa 2256																
Pro Asn Asn Pro His Phe Leu Pro Ser Ser Ser Gly Ala Gln Gly Glu 655 660 665 670																
ggg cac agg gtc tcc tcg ccc atc agc agc cag gtg tgc act gca cag 2304																
Gly His Arg Val Ser Ser Pro Ile Ser Ser Gln Val Cys Thr Ala Gln 675 680 685																
atg gct ggt tta cac tct tct gat aag gtg ggg cca aag ttt tca att 2352																
Met Ala Gly Leu His Ser Ser Asp Lys Val Gly Pro Lys Phe Ser Ile 690 695 700																
cca tcc cca act ttt tct aag tca agt tca gca att tca gag qta aca 2400																

Pro	Ser	Pro	Thr	Phe	Ser	Lys	Ser	Ser	Ser	Ala	Ile	Ser	Glu	Val	Thr	
		705					710					715				
cag	cct	cca	tcc	tat	gaa	gat	gcc	gta	aag	cag	caa	atg	acc	cgg	agt	2448
Gln	Pro	Pro	Ser	Tyr	Glu	Asp	Ala	Val	Lys	Gln	Gln	Met	Thr	Arg	Ser	
		720				725					730					
cag	cag	atg	gat	gaa	ctc	ctg	gac	gtg	ctt	att	gaa	agc	gga	gaa	atg	2496
Gln	Gln	Met	Asp	Glu	Leu	Leu	Asp	Val	Leu	Ile	Glu	Ser	Gly	Glu	Met	
735					740					745					750	
cca	gca	gac	gct	aga	gag	gat	cac	tca	tgt	ctt	caa	aaa	gtc	cca	aag	2544
Pro	Ala	Asp	Ala	Arg	Glu	Asp	His	Ser	Cys	Leu	Gln	Lys	Val	Pro	Lys	
				755					760						765	
ata	ccc	aga	tct	tcc	cga	agt	cca	act	gct	gtc	ctc	acc	aag	ccc	tcg	2592
Ile	Pro	Arg	Ser	Ser	Arg	Ser	Pro	Thr	Ala	Val	Leu	Thr	Lys	Pro	Ser	
			770					775					780			
gct	tcc	ttt	gaa	caa	gcc	tct	tca	ggc	agc	cag	atc	ccc	ttt	gat	ccc	2640
Ala	Ser	Phe	Glu	Gln	Ala	Ser	Ser	Gly	Ser	Gln	Ile	Pro	Phe	Asp	Pro	
		785					790					795				
tat	gcc	acc	gac	agt	gat	gag	cat	ctt	gaa	gtc	tta	tta	aat	tcc	cag	2688
Tyr	Ala	Thr	Asp	Ser	Asp	Glu	His	Leu	Glu	Val	Leu	Leu	Asn	Ser	Gln	
	800					805					810					
agc	ccc	cta	gga	aag	atg	agt	gat	gtc	acc	ctt	cta	aaa	att	ggg	agc	2736
Ser	Pro	Leu	Gly	Lys	Met	Ser	Asp	Val	Thr	Leu	Leu	Lys	Ile	Gly	Ser	
815					820					825					830	
gaa	gag	cct	cac	ttt	gat	ggg	ata	atg	gat	gga	ttc	tct	ggg	aag	gct	2784
Glu	Glu	Pro	His	Phe	Asp	Gly	Ile	Met	Asp	Gly	Phe	Ser	Gly	Lys	Ala	
				835					840						845	
gca	gaa	gac	ctc	ttc	aat	gca	cat	gag	atc	ttg	cca	ggc	ccc	ctc	tct	2832
Ala	Glu	Asp	Leu	Phe	Asn	Ala	His	Glu	Ile	Leu	Pro	Gly	Pro	Leu	Ser	
				850					855							
cca	atg	cag	aca	cag	ttt	tca	ccc	tct	tct	gtg	gac	agc	aat	ggg	ctg	2880
Pro	Met	Gln	Thr	Gln	Phe	Ser	Pro	Ser	Ser	Val	Asp	Ser	Asn	Gly	Leu	
		865					870					875				
cag	tta	agc	ttc	act	gaa	tct	ccc	tgg	gaa	acc	atg	gag	tgg	ctg	gac	2928
Gln	Leu	Ser	Phe	Thr	Glu	Ser	Pro	Trp	Glu	Thr	Met	Glu	Trp	Leu	Asp	
	880					885					890					
ctc	act	ccg	cca	aat	tcc	aca	cca	ggc	ttt	agc	gcc	ctc	acc	acc	agc	2976
Leu	Thr	Pro	Pro	Asn	Ser	Thr	Pro	Gly	Phe	Ser	Ala	Leu	Thr	Thr	Ser	
895					900					905					910	
agc	ccc	agc	atc	ttc	aac	atc	gat	ttc	ctg	gat	gtc	act	gat	ctc	aat	3024
Ser	Pro	Ser	Ile	Phe	Asn	Ile	Asp	Phe	Leu	Asp	Val					



Leu Gly Pro Pro Ser Thr Pro Ile Ala Val His Ala Ala Val Lys Ser  
 225 230 235 240  
 Lys Ser Leu Gly Asp Ser Lys Asn Arg His Lys Lys Pro Lys Asp Pro  
 245 250 255  
 Lys Pro Lys Val Lys Lys Leu Lys Tyr His Gln Tyr Ile Pro Pro Asp  
 260 265 270  
 Gln Lys Ala Glu Lys Ser Pro Pro Pro Met Asp Ser Ala Tyr Ala Arg  
 275 280 285  
 Leu Leu Gln Gln Gln Gln Leu Phe Leu Gln Leu Gln Ile Leu Ser Gln  
 290 295 300  
 Gln Gln Gln Gln Gln Gln His Arg Phe Ser Tyr Leu Gly Met His Gln  
 305 310 315 320  
 Ala Gln Leu Lys Glu Pro Asn Glu Gln Met Val Arg Asn Pro Asn Ser  
 325 330 335  
 Ser Ser Thr Pro Leu Ser Asn Thr Pro Leu Ser Pro Val Lys Asn Ser  
 340 345 350  
 Phe Ser Gly Gln Thr Gly Val Ser Ser Phe Lys Pro Gly Pro Leu Pro  
 355 360 365  
 Pro Asn Leu Asp Asp Leu Lys Val Ser Glu Leu Arg Gln Gln Leu Arg  
 370 375 380  
 Ile Arg Gly Leu Pro Val Ser Gly Thr Lys Thr Ala Leu Met Asp Arg  
 385 390 395 400  
 Leu Arg Pro Phe Gln Asp Cys Ser Gly Asn Pro Val Pro Asn Phe Gly  
 405 410 415  
 Asp Ile Thr Thr Val Thr Phe Pro Val Thr Pro Asn Thr Leu Pro Asn  
 420 425 430  
 Tyr Gln Ser Ser Ser Ser Thr Ser Ala Leu Ser Asn Gly Phe Tyr His  
 435 440 445  
 Phe Gly Ser Thr Ser Ser Ser Pro Pro Ile Ser Pro Ala Ser Ser Asp  
 450 455 460  
 Leu Ser Val Ala Gly Ser Leu Pro Asp Thr Phe Asn Asp Ala Ser Pro  
 465 470 475 480  
 Ser Phe Gly Leu His Pro Ser Pro Val His Val Cys Thr Glu Glu Ser  
 485 490 495  
 Leu Met Ser Ser Leu Asn Gly Gly Ser Val Pro Ser Glu Leu Asp Gly  
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Leu Asp Ser Glu Lys Asp Lys Met Leu Val Glu Lys Gln Lys Val Ile  
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 Leu Arg Met Gln Leu Gln Lys Gln Lys Arg Asn Asn Cys Ser Glu Lys  
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 Lys Pro Leu Pro Phe Leu Ala Ala Ser Ile Lys Gln Glu Glu Ala Val  
 565 570 575  
 Ser Ser Cys Pro Phe Ala Ser Gln Val Pro Val Lys Arg Gln Ser Ser  
 580 585 590  
 Ser Ser Glu Cys His Pro Pro Ala Cys Glu Ala Ala Gln Leu Gln Pro  
 595 600 605  
 Leu Gly Asn Ala His Cys Val Glu Ser Ser Asp Gln Thr Asn Val Leu  
 610 615 620  
 Ser Ser Thr Phe Leu Ser Pro Gln Cys Ser Pro Gln His Ser Pro Leu  
 625 630 635 640  
 Gly Ala Val Lys Ser Pro Gln His Ile Ser Leu Pro Pro Ser Pro Asn  
 645 650 655  
 Asn Pro His Phe Leu Pro Ser Ser Ser Gly Ala Gln Gly Glu Gly His  
 660 665 670  
 Arg Val Ser Ser Pro Ile Ser Ser Gln Val Cys Thr Ala Gln Met Ala  
 675 680 685  
 Gly Leu His Ser Ser Asp Lys Val Gly Pro Lys Phe Ser Ile Pro Ser  
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 Pro Thr Phe Ser Lys Ser Ser Ser Ala Ile Ser Glu Val Thr Gln Pro  
 705 710 715 720  
 Pro Ser Tyr Glu Asp Ala Val Lys Gln Gln Met Thr Arg Ser Gln Gln  
 725 730 735  
 Met Asp Glu Leu Leu Asp Val Leu Ile Glu Ser Gly Glu Met Pro Ala  
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 Asp Ala Arg Glu Asp His Ser Cys Leu Gln Lys Val Pro Lys Ile Pro  
 755 760 765  
 Arg Ser Ser Arg Ser Pro Thr Ala Val Leu Thr Lys Pro Ser Ala Ser  
 770 775 780  
 Phe Glu Gln Ala Ser Ser Gly Ser Gln Ile Pro Phe Asp Pro Tyr Ala  
 785 790 795 800

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Thr Asp Ser Asp Glu His Leu Glu Val Leu Leu Asn Ser Gln Ser Pro  
805 810 815

Leu Gly Lys Met Ser Asp Val Thr Leu Leu Lys Ile Gly Ser Glu Glu  
820 825 830

Pro His Phe Asp Gly Ile Met Asp Gly Phe Ser Gly Lys Ala Ala Glu  
835 840 845

Asp Leu Phe Asn Ala His Glu Ile Leu Pro Gly Pro Leu Ser Pro Met  
850 855 860

Gln Thr Gln Phe Ser Pro Ser Ser Val Asp Ser Asn Gly Leu Gln Leu  
865 870 875 880

Ser Phe Thr Glu Ser Pro Trp Glu Thr Met Glu Trp Leu Asp Leu Thr  
885 890 895

Pro Pro Asn Ser Thr Pro Gly Phe Ser Ala Leu Thr Thr Ser Ser Pro  
900 905 910

Ser Ile Phe Asn Ile Asp Phe Leu Asp Val Thr Asp Leu Asn Leu Asn  
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Ser Ser Met Asp Leu His Leu Gln Gln Trp  
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<213> Homo sapiens

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Met Thr Leu Leu Gly Ser Glu His Ser Leu Leu Ile Arg Ser Lys Phe  
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Arg Ser Val Leu Gln Leu Arg Leu Gln Gln Arg Arg Thr Gln Glu Gln  
20 25 30

Leu Ala Asn Gln Gly Ile Ile Pro Pro Leu Lys Arg Pro Ala Glu Phe  
35 40 45

His Glu Gln Arg Lys His Leu Asp Ser Asp Lys Ala Lys Asn Ser Leu  
50 55 60

Lys Arg Lys Ala Arg Asn Arg Cys Asn Ser Ala Asp Leu Val Asn Met  
65 70 75 80

His Ile Leu Gln Ala Ser Thr Ala Glu Arg Ser Ile Pro Thr Ala Gln  
85 90 95

Met Lys Leu Lys Arg Ala Arg Leu Ala Asp Asp Leu Asn Glu Lys Ile

100 105 110  
115 120 125  
130 135 140  
145 150 155 160  
165 170 175  
180 185 190  
195 200 205  
210 215 220  
225 230 235 240  
245 250 255  
260 265 270  
275 280 285  
290 295 300  
305 310 315 320  
325 330 335  
340 345 350  
355 360 365  
370 375 380

100					105					110						
Ala	Leu	Arg	Pro	Gly	Pro	Leu	Glu	Leu	Val	Glu	Lys	Asn	Ile	Leu	Pro	
115					120					125						
Val	Asp	Ser	Ala	Val	Lys	Glu	Ala	Ile	Lys	Gly	Asn	Gln	Val	Ser	Phe	
130					135					140						
Ser	Lys	Ser	Thr	Asp	Ala	Phe	Ala	Phe	Glu	Glu	Asp	Ser	Ser	Ser	Asp	
145					150					155					160	
Gly	Leu	Ser	Pro	Asp	Gln	Thr	Arg	Ser	Glu	Asp	Pro	Gln	Asn	Ser	Ala	
165					170					175						
Gly	Ser	Pro	Pro	Asp	Ala	Lys	Ala	Ser	Asp	Thr	Pro	Ser	Thr	Gly	Ser	
180					185					190						
Leu	Gly	Thr	Asn	Gln	Asp	Leu	Ala	Ser	Gly	Ser	Glu	Asn	Asp	Arg	Asn	
195					200					205						
Asp	Ser	Ala	Ser	Gln	Pro	Ser	His	Gln	Ser	Asp	Ala	Gly	Lys	Gln	Gly	
210					215					220						
Leu	Gly	Pro	Pro	Ser	Thr	Pro	Ile	Ala	Val	His	Ala	Ala	Val	Lys	Ser	
225					230					235					240	
Lys	Ser	Leu	Gly	Asp	Ser	Lys	Asn	Arg	His	Lys	Lys	Pro	Lys	Asp	Pro	
245					250					255						
Lys	Pro	Lys	Val	Lys	Lys	Leu	Lys	Tyr	His	Gln	Tyr	Ile	Pro	Pro	Asp	
260					265					270						
Gln	Lys	Ala	Glu	Lys	Ser	Pro	Pro	Pro	Met	Asp	Ser	Ala	Tyr	Ala	Arg	
275					280					285						
Leu	Leu	Gln	Gln	Gln	Gln	Leu	Phe	Leu	Gln	Leu	Gln	Ile	Leu	Ser	Gln	
290					295					300						
Gln	Gln	Gln	Gln	Gln	Gln	His	Arg	Phe	Ser	Tyr	Leu	Gly	Met	His	Gln	
305					310					315					320	
Ala	Gln	Leu	Lys	Glu	Pro	Asn	Glu	Gln	Met	Val	Arg	Asn	Pro	Asn	Ser	
325					330					335						
Ser	Ser	Thr	Pro	Leu	Ser	Asn	Thr	Pro	Leu	Ser	Pro	Val	Lys	Asn	Ser	
340					345					350						
Phe	Ser	Gly	Gln	Thr	Gly	Val	Ser	Ser	Phe	Lys	Pro	Gly	Pro	Leu	Pro	
355					360					365						
Pro	Asn	Leu	Asp	Asp	Leu	Lys	Val	Ser	Glu	Leu	Arg	Gln	Gln	Leu	Arg	
370					375					380						
Ile	Arg	Gly	Leu	Pro	Val	Ser	Gly	Thr	Lys	Thr	Ala	Leu	Met	Asp	Arg	

385		390		395		400
Leu Arg Pro Phe Gln Asp Cys Ser Gly Asn Pro Val Pro Asn Phe Gly						
		405		410		415
Asp Ile Thr Thr Val Thr Phe Pro Val Thr Pro Asn Thr Leu Pro Asn						
		420		425		430
Tyr Gln Ser Ser Ser Ser Thr Ser Ala Leu Ser Asn Gly Phe Tyr His						
		435		440		445
Phe Gly Ser Thr Ser Ser Ser Pro Pro Ile Ser Pro Ala Ser Ser Asp						
		450		455		460
Leu Ser Val Ala Gly Ser Leu Pro Asp Thr Phe Asn Asp Ala Ser Pro						
		465		470		475
				475		480
Ser Phe Gly Leu His Pro Ser Pro Val His Val Cys Thr Glu Glu Ser						
		485		490		495
Leu Met Ser Ser Leu Asn Gly Gly Ser Val Pro Ser Glu Leu Asp Gly						
		500		505		510
Leu Asp Ser Glu Lys Asp Lys Met Leu Val Glu Lys Gln Lys Val Ile						
		515		520		525
Asn Glu Leu Thr Trp Lys Leu Gln Gln Glu Gln Arg Gln Val Glu Glu						
		530		535		540
Leu Arg Met Gln Leu Gln Lys Gln Lys Arg Asn Asn Cys Ser Glu Lys						
		545		550		555
				555		560
Lys Pro Leu Pro Phe Leu Ala Ala Ser Ile Lys Gln Glu Glu Ala Val						
		565		570		575
Ser Ser Cys Pro Phe Ala Ser Gln Val Pro Val Lys Arg Gln Ser Ser						
		580		585		590
Ser Ser Glu Cys His Pro Pro Ala Cys Glu Ala Ala Gln Leu Gln Pro						
		595		600		605
Leu Gly Asn Ala His Cys Val Glu Ser Ser Asp Gln Thr Asn Val Leu						
		610		615		620
Ser Ser Thr Phe Leu Ser Pro Gln Cys Ser Pro Gln His Ser Pro Leu						
		625		630		635
				635		640
Gly Ala Val Lys Ser Pro Gln His Ile Ser Leu Pro Pro Ser Pro Asn						
		645		650		655
Asn Pro His Phe Leu Pro Ser Ser Ser Gly Ala Gln Gly Glu Gly His						
		660		665		670
Arg Val Ser Ser Pro Ile Ser Ser Gln Val Cys Thr Ala Gln Met Ala						

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675	680	685
Gly Leu His Ser Ser Asp Lys Val Gly Pro Lys Phe Ser Ile Pro Ser		
690	695	700
Pro Thr Phe Ser Lys Ser Ser Ser Ala Ile Ser Glu Val Thr Gln Pro		
705	710	715
Pro Ser Tyr Glu Asp Ala Val Lys Gln Gln Met Thr Arg Ser Gln Gln		
	725	730
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Met Asp Glu Leu Leu Asp Val Leu Ile Glu Ser Gly Glu Met Pro Ala		
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Asp Ala Arg Glu Asp His Ser Cys Leu Gln Lys Val Pro Lys Ile Pro		
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		765
Arg Ser Ser Arg Ser Pro Thr Ala Val Leu Thr Lys Pro Ser Ala Ser		
	770	775
		780
Phe Glu Gln Ala Ser Ser Gly Ser Gln Ile Pro Phe Asp Pro Tyr Ala		
785	790	795
		800
Thr Asp Ser Asp Glu His Leu Glu Val Leu Leu Asn Ser Gln Ser Pro		
	805	810
		815
Leu Gly Lys Met Ser Asp Val Thr Leu Leu Lys Ile Gly Ser Glu Glu		
	820	825
		830
Pro His Phe Asp Gly Ile Met Asp Gly Phe Ser Gly Lys Ala Ala Glu		
	835	840
		845
Asp Leu Phe Asn Ala His Glu Ile Leu Pro Gly Pro Leu Ser Pro Met		
	850	855
		860
Gln Thr Gln Phe Ser Pro Ser Ser Val Asp Ser Asn Gly Leu Gln Leu		
865	870	875
		880
Ser Phe Thr Glu Ser Pro Trp Glu Thr Met Glu Trp Leu Asp Leu Thr		
	885	890
		895
Pro Pro Asn Ser Thr Pro Gly Phe Ser Ala Leu Thr Thr Ser Ser Pro		
	900	905
		910
Ser Ile Phe Asn Ile Asp Phe Leu Asp Val Thr Asp Leu Asn Leu Asn		
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ccc Pro	cag Gln	ggc Gly	tct Ser 175	aca Thr	gga Gly	tcc Ser	acc Thr	cca Pro 180	gac Asp	atc Ile	aaa Lys	tcc Ser	act Thr 185	gag Glu	gct Ala	818
cct Pro	ctg Leu	gac Asp 190	aca Thr	atc Ile	cag Gln	gat Asp	ctc Leu 195	act Thr	cct Pro	ggc Gly	tca Ser	gaa Glu 200	agt Ser	gac Asp	aag Lys	866
aat Asn 205	gat Asp	gca Ala	gcc Ala	tcc Ser	cag Gln	cca Pro 210	ggc Gly	aac Asn	cag Gln	tca Ser	gac Asp 215	cct Pro	ggg Gly	aag Lys	cag Gln	914
gtt Val 220	ctc Leu	ggc Gly	ccc Pro	ctc Leu	agc Ser	acc Thr	ccg Pro	att Ile	cct Pro	gtg Val	cac His	act Thr	gct Ala	gta Val	aag Lys 235	962
tcc Ser	aag Lys	tct Ser	ttg Leu	ggc Gly 240	gac Asp	agt Ser	aag Lys	aac Asn	cgc Arg 245	cac His	aaa Lys	aag Lys	ccc Pro	aaa Lys 250	gac Asp	1010
ccc Pro	aaa Lys	cca Pro	aag Lys 255	gtg Val	aag Lys	aag Lys	ctc Leu	aaa Lys 260	tac Tyr	cat His	cag Gln	tac Tyr	atc Ile 265	ccc Pro	cca Pro	1058
gac Asp	cag Gln	aag Lys 270	gca Ala	gag Glu	aag Lys	tct Ser	ccc Pro 275	cca Pro	ccc Pro	atg Met	gac Asp	tct Ser	gcc Ala	tat Tyr	gcc Ala	1106
cgg Arg 285	ctg Leu	ctc Leu	cag Gln	caa Gln	cag Gln	cag Gln	cta Leu 290	ttc Phe	ctg Leu	cag Gln	cta Leu	cag Gln	atc Ile	ctc Leu	agc Ser	1154
cag Gln 300	cag Gln	cag Gln	caa Gln	cag Gln	cag Gln	cag Gln	caa Gln	cag Gln	cag Gln	cag Gln	cag Gln	caa Gln	cag Gln	cag Gln	cag Gln	1202
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ctc Leu	aaa Lys	gaa Glu	cca Pro	aat Asn	gaa Glu	cag Gln	atg Met	gcc Ala 340	aga Arg	aat Asn	ccg Pro	aat Asn	cct Pro 345	tct Ser	tca Ser	1298
aca Thr	cca Pro	ctg Leu	agc Ser	aat Asn	acc Thr	cct Pro	cta Leu 355	tcc Ser	cct Pro	gtc Val	aaa Lys	aat Asn	agc Ser	att Ile	tct Ser	1346
gga	caa	act	ggc	gtt	tct	tct	ctc	aaa	cca	ggc	ccc	ctc	cca	ccc	aac	1394



tct	ggg	aag	gga	cag	ggc	cac	agc	tct	gac	agt	ccc	cct	ccg	gct	tgt	2066
Ser	Gly	Lys	Gly	Gln	Gly	His	Ser	Ser	Asp	Ser	Pro	Pro	Pro	Ala	Cys	
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gag	acg	gct	cag	ctg	ctg	cct	cac	tgt	gtg	gag	tcc	tca	ggt	caa	acc	2114
Glu	Thr	Ala	Gln	Leu	Leu	Pro	His	Cys	Val	Glu	Ser	Ser	Gly	Gln	Thr	
	605					610					615					
cat	gta	ctc	tcg	tcc	acg	ttt	ctc	agc	ccc	cag	tgc	tcc	cct	cag	cac	2162
His	Val	Leu	Ser	Ser	Thr	Phe	Leu	Ser	Pro	Gln	Cys	Ser	Pro	Gln	His	
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tcg	ccc	ctg	ggg	ggc	ctg	aag	agc	ccg	cag	cac	atc	agc	ctg	cct	cca	2210
Ser	Pro	Leu	Gly	Gly	Leu	Lys	Ser	Pro	Gln	His	Ile	Ser	Leu	Pro	Pro	
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tca	ccc	aac	aac	cat	tac	ttc	ctg	gct	tcc	tct	tcg	gga	gct	cag	aga	2258
Ser	Pro	Asn	Asn	His	Tyr	Phe	Leu	Ala	Ser	Ser	Ser	Gly	Ala	Gln	Arg	
			655					660					665			
gag	aac	cat	ggg	gtc	tct	tca	ccc	agc	agc	agc	caa	ggg	tgc	gca	cag	2306
Glu	Asn	His	Gly	Val	Ser	Ser	Pro	Ser	Ser	Ser	Gln	Gly	Cys	Ala	Gln	
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atg	act	ggt	tta	caa	tct	tct	gac	aag	gtg	ggg	cca	acg	ttt	tca	att	2354
Met	Thr	Gly	Leu	Gln	Ser	Ser	Asp	Lys	Val	Gly	Pro	Thr	Phe	Ser	Ile	
	685					690					695					
cca	tcc	cca	act	ttt	tct	aag	tca	agt	tca	gca	gtt	tca	gat	atc	acc	2402
Pro	Ser	Pro	Thr	Phe	Ser	Lys	Ser	Ser	Ser	Ala	Val	Ser	Asp	Ile	Thr	
	700				705					710					715	
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Gln	Pro	Pro	Ser	Tyr	Glu	Asp	Ala	Val	Lys	Gln	Gln	Met	Thr	Arg	Ser	
				720					725					730		
cag	cag	atg	gac	gaa	ctc	ctg	gat	gtc	ctc	att	gaa	agt	gga	gaa	atg	2498
Gln	Gln	Met	Asp	Glu	Leu	Leu	Asp	Val	Leu	Ile	Glu	Ser	Gly	Glu	Met	
			735					740					745			
cca	gcc	gat	gcc	agg	gaa	gat	cat	tca	tgt	ctt	cag	aaa	att	cca	aag	2546
Pro	Ala	Asp	Ala	Arg	Glu	Asp	His	Ser	Cys	Leu	Gln	Lys	Ile	Pro	Lys	
		750					755					760				
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Ile	Pro	Gly	Ser	Ser	Cys	Ser	Pro	Thr	Ala	Ile	Pro	Pro	Lys	Pro	Ser	
	765					770					775					
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Ala	Ser	Phe	Glu	Gln	Ala	Ser	Ser	Gly	Gly	Gln	Met	Ala	Phe	Asp	His	
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 Gly Leu Ser Pro Asp Gln Ala Arg Ser Glu Asp Pro Gln Gly Ser Thr  
 165 170 175  
 Gly Ser Thr Pro Asp Ile Lys Ser Thr Glu Ala Pro Leu Asp Thr Ile  
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 Gln Asp Leu Thr Pro Gly Ser Glu Ser Asp Lys Asn Asp Ala Ala Ser  
 195 200 205  
 Gln Pro Gly Asn Gln Ser Asp Pro Gly Lys Gln Val Leu Gly Pro Leu  
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 Ser Thr Pro Ile Pro Val His Thr Ala Val Lys Ser Lys Ser Leu Gly  
 225 230 235 240  
 Asp Ser Lys Asn Arg His Lys Lys Pro Lys Asp Pro Lys Pro Lys Val  
 245 250 255  
 Lys Lys Leu Lys Tyr His Gln Tyr Ile Pro Pro Asp Gln Lys Ala Glu  
 260 265 270  
 Lys Ser Pro Pro Pro Met Asp Ser Ala Tyr Ala Arg Leu Leu Gln Gln  
 275 280 285  
 Gln Gln Leu Phe Leu Gln Leu Gln Ile Leu Ser Gln Gln Gln Gln Gln  
 290 295 300

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Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln Gln  
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Arg Phe Ser Tyr Pro Gly Met His Gln Thr His Leu Lys Glu Pro Asn  
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Glu Gln Met Ala Arg Asn Pro Asn Pro Ser Ser Thr Pro Leu Ser Asn  
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Thr Pro Leu Ser Pro Val Lys Asn Ser Ile Ser Gly Gln Thr Gly Val  
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Ser Ser Leu Lys Pro Gly Pro Leu Pro Pro Asn Leu Asp Asp Leu Lys  
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Val Ser Glu Leu Arg Gln Gln Leu Arg Ile Arg Gly Leu Pro Val Ser  
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Gly Thr Lys Thr Ala Leu Val Asp Arg Leu Arg Pro Phe Gln Asp Cys  
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Ala Gly Asn Pro Val Pro Asn Phe Gly Asp Ile Thr Thr Val Thr Phe  
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Pro Val Thr Pro Asn Thr Leu Pro Ser Tyr Gln Ser Ser Pro Thr Gly  
435 440 445

Phe Tyr His Phe Gly Ser Thr Ser Ser Ser Pro Pro Ile Ser Pro Ala  
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Ser Ser Asp Leu Ser Ala Ala Gly Ser Leu Pro Asp Thr Phe Thr Asp  
465 470 475 480

Ala Ser Pro Gly Phe Gly Leu His Ala Ser Pro Val Pro Ala Cys Thr  
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Asp Glu Ser Leu Leu Ser Ser Leu Asn Gly Gly Ser Gly Pro Ser Glu  
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Pro Asp Gly Leu Asp Ser Glu Lys Asp Lys Met Leu Val Glu Lys Gln  
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Lys Val Ile Asn Gln Leu Thr Trp Lys Leu Arg Gln Glu Gln Arg Gln  
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Val Glu Glu Leu Arg Met Gln Leu Gln Lys Gln Lys Ser Ser Cys Ser  
545 550 555 560

Asp Gln Lys Pro Leu Pro Phe Leu Ala Thr Thr Ile Lys Gln Glu Asp  
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Val Ser Ser Cys Pro Phe Ala Pro Gln Gln Ala Ser Gly Lys Gly Gln  
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Gly	His	Ser	Ser	Asp	Ser	Pro	Pro	Pro	Ala	Cys	Glu	Thr	Ala	Gln	Leu	595	600	605
Leu	Pro	His	Cys	Val	Glu	Ser	Ser	Gly	Gln	Thr	His	Val	Leu	Ser	Ser	610	615	620
Thr	Phe	Leu	Ser	Pro	Gln	Cys	Ser	Pro	Gln	His	Ser	Pro	Leu	Gly	Gly	625	630	635
Leu	Lys	Ser	Pro	Gln	His	Ile	Ser	Leu	Pro	Pro	Ser	Pro	Asn	Asn	His	645	650	655
Tyr	Phe	Leu	Ala	Ser	Ser	Ser	Gly	Ala	Gln	Arg	Glu	Asn	His	Gly	Val	660	665	670
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Ser	Ser	Asp	Lys	Val	Gly	Pro	Thr	Phe	Ser	Ile	Pro	Ser	Pro	Thr	Phe	690	695	700
Ser	Lys	Ser	Ser	Ser	Ala	Val	Ser	Asp	Ile	Thr	Gln	Pro	Pro	Ser	Tyr	705	710	715
Glu	Asp	Ala	Val	Lys	Gln	Gln	Met	Thr	Arg	Ser	Gln	Gln	Met	Asp	Glu	725	730	735
Leu	Leu	Asp	Val	Leu	Ile	Glu	Ser	Gly	Glu	Met	Pro	Ala	Asp	Ala	Arg	740	745	750
Glu	Asp	His	Ser	Cys	Leu	Gln	Lys	Ile	Pro	Lys	Ile	Pro	Gly	Ser	Ser	755	760	765
Cys	Ser	Pro	Thr	Ala	Ile	Pro	Pro	Lys	Pro	Ser	Ala	Ser	Phe	Glu	Gln	770	775	780
Ala	Ser	Ser	Gly	Gly	Gln	Met	Ala	Phe	Asp	His	Tyr	Ala	Asn	Asp	Ser	785	790	795
Asp	Glu	His	Leu	Glu	Val	Leu	Leu	Asn	Ser	His	Ser	Pro	Ile	Gly	Lys	805	810	815
Val	Ser	Asp	Val	Thr	Leu	Leu	Lys	Ile	Gly	Ser	Glu	Glu	Pro	Pro	Phe	820	825	830
Asp	Ser	Ile	Met	Asp	Gly	Phe	Pro	Gly	Lys	Ala	Ala	Glu	Asp	Leu	Phe	835	840	845
Ser	Ala	His	Glu	Leu	Leu	Pro	Gly	Pro	Leu	Ser	Pro	Met	His	Ala	Gln	850	855	860
Leu	Ser	Pro	Pro	Ser	Val	Asp	Ser	Ser	Gly	Leu	Gln	Leu	Ser	Phe	Thr	865	870	875
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Glu Ser Pro Trp Glu Thr Met Glu Trp Leu Asp Leu Thr Pro Pro Ser  
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Ser Thr Pro Gly Phe Ser Asn Leu Thr Ser Ser Gly Pro Ser Ile Phe  
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catttgtatg tatgctctga cattgtgatt tgtacagcct accaaccaat ctaactaaaa 1893  
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 <213> Mus musculus

<400> 7

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Val	Pro	Gln	Thr	Gln	Asp	Thr	Phe	Pro	Gln	His	Val	Leu	Ser	Gln	Pro	35	40	45	
Gln	Gln	Val	Arg	Lys	Val	Phe	Thr	Asn	Ser	Ala	Ser	Ser	Asn	Thr	Val	50	55	60	
Leu	Pro	Tyr	Gln	Arg	His	Pro	Ala	Pro	Ala	Val	Gln	Gln	Pro	Phe	Ile	65	70	75	80
Asn	Lys	Ala	Ser	Asn	Ser	Val	Leu	Gln	Ser	Arg	Asn	Ala	Pro	Leu	Pro	85	90	95	
Ser	Leu	Gln	Asn	Gly	Pro	Asn	Thr	Pro	Asn	Lys	Pro	Ser	Ser	Pro	Pro	100	105	110	
Pro	Pro	Gln	Gln	Phe	Val	Val	Gln	His	Ser	Leu	Phe	Gly	Ser	Pro	Val	115	120	125	
Ala	Lys	Thr	Lys	Asp	Pro	Pro	Arg	Tyr	Glu	Glu	Ala	Ile	Lys	Gln	Thr	130	135	140	
Arg	Ser	Thr	Gln	Ala	Pro	Leu	Pro	Glu	Ile	Ser	Asn	Ala	His	Ser	Gln	145	150	155	160
Gln	Met	Asp	Asp	Leu	Phe	Asp	Ile	Leu	Ile	Lys	Ser	Gly	Glu	Ile	Ser	165	170	175	
Leu	Pro	Ile	Lys	Glu	Glu	Pro	Ser	Pro	Ile	Ser	Lys	Met	Arg	Pro	Val	180	185	190	
Thr	Ala	Ser	Ile	Thr	Thr	Met	Pro	Val	Asn	Thr	Val	Val	Ser	Arg	Pro	195	200	205	
Pro	Pro	Gln	Val	Gln	Met	Ala	Pro	Pro	Val	Ser	Leu	Glu	Pro	Met	Gly	210	215	220	
Ser	Leu	Ser	Ala	Ser	Leu	Glu	Asn	Gln	Leu	Glu	Ala	Phe	Leu	Asp	Gly	225	230	235	240
Thr	Leu	Pro	Ser	Ala	Asn	Glu	Ile	Pro	Pro	Leu	Gln	Ser	Ser	Ser	Glu	245	250	255	

Asp Arg Glu Pro Phe Ser Leu Ile Glu Asp Leu Gln Asn Asp Leu Leu  
                   260                                  265                                  270  
 Ser His Ser Gly Met Leu Asp His Ser His Ser Pro Met Glu Thr Ser  
                   275                                  280                                  285  
 Glu Thr Gln Phe Ala Ala Gly Thr Pro Cys Leu Ser Leu Asp Leu Ser  
                   290                                  295                                  300  
 Asp Ser Asn Leu Asp Asn Met Glu Trp Leu Asp Ile Thr Met Pro Asn  
 305                                  310                                  315                                  320  
 Ser Ser Ser Gly Leu Thr Pro Leu Ser Thr Thr Ala Pro Ser Met Phe  
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 Ser Ala Asp Phe Leu Asp Pro Gln Asp Leu Pro Leu Pro Trp Asp  
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 <213> Mus musculus

<400> 8  
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                                   20                                  25                                  30  
 Thr Ala Leu  
                   35

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 <212> PRT  
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<400> 9  
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   1                                  5                                  10                                  15  
 Ser Leu Pro Val Ser Gly Thr Lys Thr Glu Leu Ile Glu Arg Leu Arg  
                   20                                  25                                  30  
 Ala Tyr Gln  
                   35

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<211> 35  
<212> PRT  
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<400> 10  
Val Lys Lys Leu Lys Val Ser Glu Leu Lys Glu Glu Leu Lys Lys Arg  
1 5 10 15  
Arg Leu Ser Asp Lys Gly Leu Lys Ala Asp Leu Met Glu Arg Leu Gln  
20 25 30  
Ala Ala Leu  
35

<210> 11  
<211> 35  
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<400> 11  
Val Lys Lys Leu Lys Val Ser Glu Leu Lys Glu Glu Leu Lys Lys Arg  
1 5 10 15  
Arg Leu Ser Asp Lys Gly Leu Lys Ala Glu Leu Met Glu Arg Leu Gln  
20 25 30  
Ala Ala Leu  
35

<210> 12  
<211> 35  
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<213> Mus musculus

<400> 12  
Val Lys Lys Leu Lys Val Ser Glu Leu Lys Glu Glu Leu Lys Lys Arg  
1 5 10 15  
Arg Leu Ser Asp Lys Gly Leu Lys Ala Asp Leu Met Asp Arg Leu Gln  
20 25 30  
Ala Ala Leu  
35

<210> 13  
<211> 35  
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<400> 13

Val Lys Lys Leu Lys Val Ser Glu Leu Lys Glu Glu Leu Lys Lys Arg  
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Arg Leu Ser Asp Lys Gly Leu Lys Ala Asp Leu Met Asp Arg Leu Gln  
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Ala Ala Leu  
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<400> 14  
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Gln Phe Leu  
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<400> 15  
Val Lys Lys Leu Lys Val Ser Glu Leu Lys Glu Glu Leu Lys Lys Arg  
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Arg Leu Ser Asp Lys Gly Leu Lys Ala Asp Leu Met Asp Arg Leu Gln  
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Ala Ala Leu  
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<210> 16  
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<400> 16  
Val Lys Lys Leu Lys Val Ser Glu Leu Lys Glu Glu Leu Lys Lys Arg  
1 5 10 15

Arg Leu Ser Asp Lys Gly Leu Lys Ala Asp Leu Met Asp Arg Leu Gln  
20 25 30



Ala Ala Leu  
35

<210> 17  
<211> 35  
<212> PRT  
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<400> 17  
Leu Gln Ala Leu Arg Val Thr Asp Leu Lys Ala Ala Leu Glu Gln Arg  
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Gly Leu Ala Lys Ser Gly Gln Lys Ser Ala Leu Val Lys Arg Leu Lys  
20 25 30

Gly Ala Leu  
35

<210> 18  
<211> 35  
<212> PRT  
<213> Mus musculus

<400> 18  
Leu Gln Ala Leu Arg Val Thr Asp Leu Lys Ala Ala Leu Glu Gln Arg  
1 5 10 15  
Gly Leu Ala Lys Ser Gly Gln Lys Ser Ala Leu Val Lys Arg Leu Lys  
20 25 30

Gly Ala Leu  
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<210> 19  
<211> 35  
<212> PRT  
<213> Mus musculus

<400> 19  
Leu Ser Glu Leu Arg Val Ile Asp Leu Arg Ala Glu Leu Lys Lys Arg  
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Lys Ala Val  
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<210> 20  
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 <212> PRT  
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<400> 20  
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 Lys Ala Ile  
 35

<210> 21  
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 Ala Ala Leu  
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<210> 22  
 <211> 35  
 <212> PRT  
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<400> 22  
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 Gly Leu Arg Val Ser Gly Lys Lys Ala Asp Leu Leu Asp Asn Leu Thr  
 20 25 30  
 Asn Tyr Val  
 35

<210> 23  
 <211> 35  
 <212> PRT  
 <213> Mus musculus

<400> 23

Ala Asn Lys Leu Lys Val Asp Glu Leu Arg Leu Lys Leu Ala Glu Arg  
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Gly Leu Ser Thr Thr Gly Val Lys Ala Val Leu Val Glu Arg Leu Glu  
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Glu Ala Ile  
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<210> 24

<211> 3907

<212> PRT

<213> Mus musculus

<400> 24

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Cys Cys Thr Thr Thr Gly Ala Ala Ala Gly Thr Cys Cys Ala Gly  
20 25 30

Cys Cys Gly Cys Ala Thr Thr Thr Cys Ala Thr Gly Ala Gly Cys Ala  
35 40 45

Gly Ala Gly Ala Ala Gly Gly Ala Gly Cys Thr Thr Gly Gly Ala Gly  
50 55 60

Cys Gly Gly Gly Cys Cys Ala Gly Gly Ala Cys Ala Gly Ala Gly Gly  
65 70 75 80

Ala Cys Thr Ala Thr Cys Thr Cys Ala Ala Ala Cys Gly Gly Ala Ala  
85 90 95

Gly Ala Thr Thr Cys Gly Thr Thr Cys Cys Cys Gly Gly Cys Cys Gly  
100 105 110

Gly Ala Gly Ala Gly Ala Thr Cys Gly Gly Ala Gly Cys Thr Gly Gly  
115 120 125

Thr Cys Ala Gly Gly Ala Thr Gly Cys Ala Cys Ala Thr Thr Thr Thr  
130 135 140

Gly Gly Ala Ala Gly Ala Gly Ala Cys Cys Thr Cys Gly Gly Cys Thr  
145 150 155 160

Gly Ala Gly Cys Cys Ala Thr Cys Cys Cys Thr Cys Cys Ala Gly Gly  
165 170 175

Cys Cys Ala Ala Gly Cys Ala Gly Cys Thr Gly Ala Ala Gly Cys Thr  
180 185 190

Gly	Ala	Ala	Gly	Ala	Gly	Ala	Gly	Cys	Cys	Ala	Gly	Ala	Cys	Thr	Ala	195	200	205
Gly	Cys	Cys	Gly	Ala	Thr	Gly	Ala	Cys	Cys	Thr	Cys	Ala	Ala	Thr	Gly	210	215	220
Ala	Gly	Ala	Ala	Gly	Ala	Thr	Thr	Gly	Cys	Ala	Cys	Ala	Gly	Ala	Gly	225	230	235
Gly	Cys	Cys	Thr	Gly	Gly	Cys	Cys	Cys	Cys	Ala	Thr	Gly	Gly	Ala	Gly	245	250	255
Cys	Thr	Gly	Gly	Thr	Gly	Gly	Ala	Gly	Ala	Ala	Gly	Ala	Ala	Cys	Ala	260	265	270
Thr	Cys	Cys	Thr	Thr	Cys	Cys	Thr	Gly	Thr	Thr	Gly	Ala	Gly	Thr	Cys	275	280	285
Cys	Ala	Gly	Cys	Cys	Thr	Gly	Ala	Ala	Gly	Gly	Ala	Ala	Gly	Cys	Cys	290	295	300
Ala	Thr	Cys	Ala	Thr	Thr	Gly	Thr	Gly	Gly	Gly	Cys	Cys	Ala	Gly	Gly	305	310	315
Thr	Gly	Ala	Ala	Cys	Thr	Ala	Thr	Cys	Cys	Cys	Ala	Ala	Ala	Gly	Thr	325	330	335
Ala	Gly	Cys	Ala	Gly	Ala	Cys	Ala	Gly	Cys	Thr	Cys	Thr	Thr	Cys	Cys	340	345	350
Thr	Thr	Cys	Gly	Ala	Thr	Gly	Ala	Gly	Gly	Ala	Cys	Ala	Gly	Cys	Ala	355	360	365
Gly	Cys	Gly	Ala	Thr	Gly	Cys	Cys	Thr	Thr	Ala	Thr	Cys	Cys	Cys	Cys	370	375	380
Cys	Gly	Ala	Gly	Cys	Ala	Gly	Cys	Cys	Thr	Gly	Cys	Cys	Ala	Gly	Cys	385	390	395
Cys	Ala	Thr	Gly	Ala	Gly	Thr	Cys	Cys	Cys	Ala	Gly	Gly	Gly	Thr	Thr	405	410	415
Cys	Thr	Gly	Thr	Gly	Cys	Cys	Gly	Thr	Cys	Ala	Cys	Cys	Cys	Cys	Thr	420	425	430
Gly	Gly	Ala	Gly	Gly	Cys	Cys	Cys	Gly	Ala	Gly	Thr	Cys	Ala	Gly	Cys	435	440	445
Gly	Ala	Ala	Cys	Cys	Ala	Cys	Thr	Gly	Cys	Thr	Cys	Ala	Gly	Thr	Gly	450	455	460
Cys	Cys	Ala	Cys	Cys	Thr	Cys	Thr	Gly	Cys	Ala	Thr	Cys	Cys	Cys	Cys	465	470	475



755					760					765					
Cys	Cys	Cys	Cys	Ala	Thr	Gly	Gly	Ala	Cys	Thr	Cys	Ala	Thr	Cys	Cys
770						775					780				
Thr	Ala	Cys	Gly	Cys	Cys	Ala	Ala	Gly	Ala	Thr	Cys	Cys	Thr	Gly	Cys
785						790					795				800
Ala	Gly	Cys	Ala	Gly	Cys	Ala	Gly	Cys	Ala	Gly	Cys	Thr	Cys	Thr	Thr
				805					810					815	
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			820					825					830		
Cys	Thr	Cys	Ala	Ala	Cys	Cys	Ala	Gly	Cys	Ala	Gly	Cys	Ala	Gly	Cys
			835				840					845			
Ala	Gly	Cys	Ala	Gly	Cys	Ala	Cys	Cys	Ala	Cys	Ala	Ala	Cys	Thr	Ala
	850					855					860				
Cys	Cys	Ala	Gly	Gly	Cys	Cys	Ala	Thr	Cys	Cys	Thr	Gly	Cys	Cys	Thr
865						870					875				880
Gly	Cys	Cys	Cys	Cys	Gly	Cys	Cys	Ala	Ala	Ala	Gly	Thr	Cys	Ala	Gly
				885					890					895	
Cys	Ala	Gly	Gly	Cys	Gly	Ala	Gly	Gly	Cys	Cys	Cys	Thr	Gly	Gly	Gly
			900					905					910		
Ala	Ala	Gly	Cys	Ala	Gly	Cys	Gly	Gly	Gly	Ala	Cys	Cys	Cys	Cys	Cys
		915					920					925			
Cys	Cys	Ala	Gly	Thr	Ala	Cys	Gly	Cys	Ala	Gly	Cys	Cys	Thr	Cys	Thr
		930				935						940			
Cys	Cys	Ala	Cys	Thr	Ala	Cys	Cys	Ala	Ala	Thr	Ala	Gly	Cys	Ala	Gly
945				950					955						960
Cys	Thr	Cys	Cys	Ala	Gly	Cys	Thr	Cys	Gly	Gly	Gly	Cys	Gly	Cys	Cys
				965					970					975	
Cys	Cys	Thr	Gly	Gly	Gly	Cys	Cys	Cys	Thr	Gly	Thr	Gly	Gly	Gly	Cys
			980					985					990		
Thr	Gly	Gly	Cys	Ala	Cys	Gly	Thr	Cys	Ala	Gly	Ala	Ala	Cys	Ala	Gly
	995					1000					1005				
Cys	Ala	Cys	Cys	Thr	Cys	Ala	Cys	Thr	Gly	Ala	Cys	Thr	Gly	Gly	Cys
	1010					1015					1020				
Ala	Ala	Gly	Cys	Cys	Gly	Gly	Gly	Ala	Gly	Cys	Cys	Cys	Thr	Gly	Cys
1025				1030					1035					1040	

Cys Gly Gly Cys Cys Ala Ala Cys Cys Thr Gly Gly Ala Cys Gly Ala  
 1045 1050 1055

Cys Ala Thr Gly Ala Ala Gly Gly Thr Gly Gly Cys Ala Gly Ala Gly  
 1060 1065 1070

Cys Thr Gly Ala Ala Gly Cys Ala Gly Gly Ala Gly Cys Thr Gly Ala  
 1075 1080 1085

Ala Gly Thr Thr Gly Cys Gly Ala Thr Cys Ala Cys Thr Gly Cys Cys  
 1090 1095 1100

Thr Gly Thr Cys Thr Cys Gly Gly Gly Cys Ala Cys Cys Ala Ala Ala  
 1105 1110 1115 1120

Ala Cys Thr Gly Ala Gly Cys Thr Gly Ala Thr Thr Gly Ala Gly Cys  
 1125 1130 1135

Gly Cys Cys Thr Thr Cys Gly Ala Gly Cys Cys Thr Ala Thr Cys Ala  
 1140 1145 1150

Ala Gly Ala Cys Cys Ala Ala Ala Thr Cys Ala Gly Cys Cys Cys Thr  
 1155 1160 1165

Gly Thr Gly Cys Cys Ala Gly Gly Ala Gly Cys Cys Cys Cys Ala  
 1170 1175 1180

Ala Gly Gly Cys Cys Cys Cys Thr Gly Cys Cys Gly Cys Cys Ala Cys  
 1185 1190 1195 1200

Cys Thr Cys Thr Ala Thr Cys Cys Thr Gly Cys Ala Cys Ala Ala Gly  
 1205 1210 1215

Gly Cys Thr Gly Gly Cys Gly Ala Gly Gly Thr Gly Gly Thr Gly Gly  
 1220 1225 1230

Thr Ala Gly Cys Cys Thr Thr Cys Cys Cys Ala Gly Cys Gly Gly Cys  
 1235 1240 1245

Cys Cys Gly Gly Cys Thr Gly Ala Gly Cys Ala Cys Gly Gly Gly Gly  
 1250 1255 1260

Cys Cys Ala Gly Cys Cys Cys Thr Gly Gly Thr Gly Gly Cys Ala Gly  
 1265 1270 1275 1280

Cys Ala Gly Gly Cys Cys Thr Gly Gly Cys Thr Cys Cys Ala Gly Cys  
 1285 1290 1295

Thr Gly Ala Gly Gly Thr Gly Gly Thr Gly Gly Thr Gly Gly Cys Cys  
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Ala Cys Gly Gly Thr Gly Gly Cys Cys Ala Gly Cys Ala Gly Thr Gly  
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 Cys Ala Gly Cys Ala Cys Gly Gly Gly Cys Thr Cys Cys Ala Cys Gly  
 1345 1350 1355 1360  
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 1365 1370 1375  
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 1395 1400 1405  
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1620	1625	1630
Cys Cys Gly Gly Cys Ala Gly Ala Ala Gly Cys Ala Gly Cys Ala Gly		
1635	1640	1645
Cys Thr Gly Gly Thr Gly Gly Ala Gly Cys Gly Gly Cys Thr Cys Ala		
1650	1655	1660
Ala Gly Cys Thr Gly Cys Ala Gly Cys Thr Gly Gly Ala Gly Cys Ala		
1665	1670	1675
Gly Gly Ala Gly Ala Ala Gly Cys Gly Ala Gly Cys Cys Cys Ala Gly		
1685	1690	1695
Cys Ala Gly Cys Cys Cys Gly Cys Cys Cys Cys Gly Cys Cys Cys		
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Cys Ala Cys Cys Cys Ala Thr Thr Cys Ala Ala Cys Cys Cys Cys Ala		
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Gly Cys Cys Thr Gly Gly Cys Gly Gly Cys Cys Cys Cys Ala Gly Cys		
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Cys Ala Cys Cys Ala Ala Cys Cys Ala Cys Ala Thr Ala Gly Ala Cys		
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Cys Cys Thr Thr Gly Thr Gly Cys Thr Gly Thr Gly Gly Cys Cys Cys		
1845	1850	1855
Cys Gly Gly Gly Gly Cys Cys Cys Cys Cys Gly Thr Cys Cys Gly Thr		
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1875	1880	1885

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Cys Ala Cys Cys Gly Thr Gly Ala Cys Cys Ala Ala Thr Ala Ala Gly			
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2455

2460

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 Gly Ser Thr Pro Asp Ile Lys Ser Thr Glu Ala Pro Leu Asp Thr Ile  
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 Ser Thr Pro Ile Pro Val His Thr Ala Val Lys Ser Lys Ser Leu Gly  
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Lys Lys Leu Lys Tyr His Gln Tyr Ile Pro Pro Asp Gln Lys Ala Glu	
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Gln Gln Leu Phe Leu Gln Leu Gln Ile Leu Ser Gln Gln Gln Gln Gln	
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Thr Pro Leu Ser Pro Val Lys Asn Xaa Ile Ser Gly Gln Thr Gly Val	
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Val Ser Glu Leu Arg Gln Gln Leu Arg Ile Arg Gly Leu Pro Val Ser	
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Phe Tyr His Phe Gly Ser Thr Ser Ser Ser Pro Pro Ile Ser Pro Ala	
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Gln Pro Gly Asn Gln Ser Asp Pro Gly Lys Gln Val Leu Gly Pro Leu  
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Ser Thr Pro Ile Pro Val His Thr Ala Val Lys Ser Lys Ser Leu Gly  
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Asp Ser Lys Asn Arg His Lys Lys Pro Lys Asp Pro Lys Pro Lys Val  
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Lys Lys Leu Lys Tyr His Gln Tyr Ile Pro Pro Asp Gln Lys Ala Glu  
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Asn Ser Pro Pro Pro Met Asp Ser Ala Tyr Ala Arg Leu Leu Gln Gln  
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Glu	Gln	Met	Ala	Arg	Asn	Pro	Asn	Pro	Ser	Ser	Thr	Pro	Leu	Ser	Asn		210	215	220
Thr	Pro	Leu	Ser	Pro	Val	Lys	Asn	Xaa	Ile	Ser	Gly	Gln	Thr	Gly	Val		225	230	235 240
Ser	Ser	Leu	Lys	Pro	Gly	Pro	Leu	Pro	Pro	Asn	Leu	Asp	Asp	Leu	Lys		245	250	255
Val	Ser	Glu	Leu	Arg	Gln	Gln	Leu	Arg	Ile	Arg	Gly	Leu	Pro	Val	Ser		260	265	270
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Pro	Val	Thr	Pro	Asn	Thr	Leu	Pro	Ser	Tyr	Gln	Ser	Ser	Pro	Thr	Gly		305	310	315 320
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Ala	Ser	Pro	Gly	Phe	Gly	Leu	His	Ala	Ser	Pro	Val	Pro	Ala	Cys	Thr		355	360	365
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Asp	Gln	Lys	Pro	Leu	Pro	Phe	Leu	Ala	Thr	Thr	Ile	Lys	Gln	Glu	Asp		435	440	445
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Glu	Ser	Leu	Met	Ser	Ser	Leu	Asn	Gly	Gly	Ser	Val	Pro	Ser	Glu	Leu		
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Glu	Glu	Leu	Arg	Met	Gln	Leu	Gln	Lys	Gln	Lys	Arg	Asn	Asn	Cys	Ser		
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Glu	Lys	Lys	Pro	Leu	Pro	Phe	Leu	Ala	Ala	Ser	Ile	Lys	Gln	Glu	Glu		
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Ala	Val	Ser	Ser	Cys	Pro	Phe	Ala	Ser	Gln	Val	Pro	Val	Lys	Arg	Gln		
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Gln	Pro	Leu	Gly	Asn	Ala	His	Cys	Val	Glu	Ser	Ser	Asp	Gln	Thr	Asn		
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Val	Leu	Ser	Ser	Thr	Phe	Leu	Ser	Pro	Gln	Cys	Ser	Pro	Gln	His	Ser		
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ccg	ctg	ggg	gct	gtg	aaa	agc	cca	cag	cac	atc	agt	ttg	ccc	cca	tca	2208	
Pro	Leu	Gly	Ala	Val	Lys	Ser	Pro	Gln	His	Ile	Ser	Leu	Pro	Pro	Ser		
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Gly	His	Arg	Val	Ser	Ser	Pro	Ile	Ser	Ser	Gln	Val	Cys	Thr	Ala	Gln		
				675					680				685				
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Met	Ala	Gly	Leu	His	Ser	Ser	Asp	Lys	Val	Gly	Pro	Lys	Phe	Ser	Ile		
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Pro	Ser	Pro	Thr	Phe	Ser	Lys	Ser	Ser	Ser	Ala	Ile	Ser	Glu	Val	Thr		



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3063

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 20 25 30  
 Leu Ala Asn Gln Gly Ile Ile Pro Pro Leu Lys Arg Pro Ala Glu Phe  
 35 40 45  
 His Glu Gln Arg Lys His Leu Asp Ser Asp Lys Ala Lys Asn Ser Leu  
 50 55 60  
 Lys Arg Lys Ala Arg Asn Arg Cys Asn Ser Ala Asp Leu Val Asn Met  
 65 70 75 80  
 His Ile Leu Gln Ala Ser Thr Ala Glu Arg Ser Ile Pro Thr Ala Gln  
 85 90 95  
 Met Lys Leu Lys Arg Ala Arg Leu Ala Asp Asp Leu Asn Glu Lys Ile  
 100 105 110  
 Ala Leu Arg Pro Gly Pro Leu Glu Leu Val Glu Lys Asn Ile Leu Pro  
 115 120 125  
 Val Asp Ser Ala Val Lys Glu Ala Ile Lys Gly Asn Gln Val Ser Phe  
 130 135 140  
 Ser Lys Ser Thr Asp Ala Phe Ala Phe Glu Glu Asp Ser Ser Ser Asp  
 145 150 155 160  
 Gly Leu Ser Pro Asp Gln Thr Arg Ser Glu Asp Pro Gln Asn Ser Ala  
 165 170 175  
 Gly Ser Pro Pro Asp Ala Lys Ala Ser Asp Thr Pro Ser Thr Gly Ser  
 180 185 190  
 Leu Gly Thr Asn Gln Asp Leu Ala Ser Gly Ser Glu Asn Asp Arg Asn  
 195 200 205  
 Asp Ser Ala Ser Gln Pro Ser His Gln Ser Asp Ala Gly Lys Gln Gly  
 210 215 220





Phe Glu Gln Ala Ser Ser Gly Ser Gln Ile Pro Phe Asp Pro Tyr Ala  
785 790 795 800

Thr Asp Ser Asp Glu His Leu Glu Val Leu Leu Asn Ser Gln Ser Pro  
805 810 815

Leu Gly Lys Met Ser Asp Val Thr Leu Leu Lys Ile Gly Ser Glu Glu  
820 825 830

Pro His Phe Asp Gly Ile Met Asp Gly Phe Ser Gly Lys Ala Ala Glu  
835 840 845

Asp Leu Phe Asn Ala His Glu Ile Leu Pro Gly Pro Leu Ser Pro Met  
850 855 860

Gln Thr Gln Phe Ser Pro Ser Ser Val Asp Ser Asn Gly Leu Gln Leu  
865 870 875 880

Ser Phe Thr Glu Ser Pro Trp Glu Thr Met Glu Trp Leu Asp Leu Thr  
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Pro Pro Asn Ser Thr Pro Gly Phe Ser Ala Leu Thr Thr Ser Ser Pro  
900 905 910

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Leu Ala Asn Gln Gly Ile Ile Pro Pro Leu Lys Arg Pro Ala Glu Phe  
35 40 45

His Glu Gln Arg Lys His Leu Asp Ser Asp Lys Ala Lys Asn Ser Leu  
50 55 60

Lys Arg Lys Ala Arg Asn Arg Cys Asn Ser Ala Asp Leu Val Asn Met  
65 70 75 80



His	Ile	Leu	Gln	Ala	Ser	Thr	Ala	Glu	Arg	Ser	Ile	Pro	Thr	Ala	Gln	85	90	95	
Met	Lys	Leu	Lys	Arg	Ala	Arg	Leu	Ala	Asp	Asp	Leu	Asn	Glu	Lys	Ile	100	105	110	
Ala	Leu	Arg	Pro	Gly	Pro	Leu	Glu	Leu	Val	Glu	Lys	Asn	Ile	Leu	Pro	115	120	125	
Val	Asp	Ser	Ala	Val	Lys	Glu	Ala	Ile	Lys	Gly	Asn	Gln	Val	Ser	Phe	130	135	140	
Ser	Lys	Ser	Thr	Asp	Ala	Phe	Ala	Phe	Glu	Glu	Asp	Ser	Ser	Ser	Asp	145	150	155	160
Gly	Leu	Ser	Pro	Asp	Gln	Thr	Arg	Ser	Glu	Asp	Pro	Gln	Asn	Ser	Ala	165	170	175	
Gly	Ser	Pro	Pro	Asp	Ala	Lys	Ala	Ser	Asp	Thr	Pro	Ser	Thr	Gly	Ser	180	185	190	
Leu	Gly	Thr	Asn	Gln	Asp	Leu	Ala	Ser	Gly	Ser	Glu	Asn	Asp	Arg	Asn	195	200	205	
Asp	Ser	Ala	Ser	Gln	Pro	Ser	His	Gln	Ser	Asp	Ala	Gly	Lys	Gln	Gly	210	215	220	
Leu	Gly	Pro	Pro	Ser	Thr	Pro	Ile	Ala	Val	His	Ala	Ala	Val	Lys	Ser	225	230	235	240
Lys	Ser	Leu	Gly	Asp	Ser	Lys	Asn	Arg	His	Lys	Lys	Pro	Lys	Asp	Pro	245	250	255	
Lys	Pro	Lys	Val	Lys	Lys	Leu	Lys	Tyr	His	Gln	Tyr	Ile	Pro	Pro	Asp	260	265	270	
Gln	Lys	Ala	Glu	Lys	Ser	Pro	Pro	Pro	Met	Asp	Ser	Ala	Tyr	Ala	Arg	275	280	285	
Leu	Leu	Gln	Gln	Gln	Gln	Leu	Phe	Leu	Gln	Leu	Gln	Ile	Leu	Ser	Gln	290	295	300	
Gln	Gln	Gln	Gln	Gln	Gln	His	Arg	Phe	Ser	Tyr	Leu	Gly	Met	His	Gln	305	310	315	320
Ala	Gln	Leu	Lys	Glu	Pro	Asn	Glu	Gln	Met	Val	Arg	Asn	Pro	Asn	Ser	325	330	335	
Ser	Ser	Thr	Pro	Leu	Ser	Asn	Thr	Pro	Leu	Ser	Pro	Val	Lys	Asn	Ser	340	345	350	
Phe	Ser	Gly	Gln	Thr	Gly	Val	Ser	Ser	Phe	Lys	Pro	Gly	Pro	Leu	Pro	355	360	365	

Pro	Asn	Leu	Asp	Asp	Leu	Lys	Val	Ser	Glu	Leu	Arg	Gln	Gln	Leu	Arg	370	375	380	
Ile	Arg	Gly	Leu	Pro	Val	Ser	Gly	Thr	Lys	Thr	Ala	Leu	Met	Asp	Arg	385	390	395	400
Leu	Arg	Pro	Phe	Gln	Asp	Cys	Ser	Gly	Asn	Pro	Val	Pro	Asn	Phe	Gly	405	410	415	
Asp	Ile	Thr	Thr	Val	Thr	Phe	Pro	Val	Thr	Pro	Asn	Thr	Leu	Pro	Asn	420	425	430	
Tyr	Gln	Ser	Ser	Ser	Ser	Thr	Ser	Ala	Leu	Ser	Asn	Gly	Phe	Tyr	His	435	440	445	
Phe	Gly	Ser	Thr	Ser	Ser	Ser	Pro	Pro	Ile	Ser	Pro	Ala	Ser	Ser	Asp	450	455	460	
Leu	Ser	Val	Ala	Gly	Ser	Leu	Pro	Asp	Thr	Phe	Asn	Asp	Ala	Ser	Pro	465	470	475	480
Ser	Phe	Gly	Leu	His	Pro	Ser	Pro	Val	His	Val	Cys	Thr	Glu	Glu	Ser	485	490	495	
Leu	Met	Ser	Ser	Leu	Asn	Gly	Gly	Ser	Val	Pro	Ser	Glu	Leu	Asp	Gly	500	505	510	
Leu	Asp	Ser	Glu	Lys	Asp	Lys	Met	Leu	Val	Glu	Lys	Gln	Lys	Val	Ile	515	520	525	
Asn	Glu	Leu	Thr	Trp	Lys	Leu	Gln	Gln	Glu	Gln	Arg	Gln	Val	Glu	Glu	530	535	540	
Leu	Arg	Met	Gln	Leu	Gln	Lys	Gln	Lys	Arg	Asn	Asn	Cys	Ser	Glu	Lys	545	550	555	560
Lys	Pro	Leu	Pro	Phe	Leu	Ala	Ala	Ser	Ile	Lys	Gln	Glu	Glu	Ala	Val	565	570	575	
Ser	Ser	Cys	Pro	Phe	Ala	Ser	Gln	Val	Pro	Val	Lys	Arg	Gln	Ser	Ser	580	585	590	
Ser	Ser	Glu	Cys	His	Pro	Pro	Ala	Cys	Glu	Ala	Ala	Gln	Leu	Gln	Pro	595	600	605	
Leu	Gly	Asn	Ala	His	Cys	Val	Glu	Ser	Ser	Asp	Gln	Thr	Asn	Val	Leu	610	615	620	
Ser	Ser	Thr	Phe	Leu	Ser	Pro	Gln	Cys	Ser	Pro	Gln	His	Ser	Pro	Leu	625	630	635	640
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Ser Ser Met Asp Leu His Leu Gln Gln Trp  
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Met Thr Leu Leu Gly Ser Glu His Ser Leu Leu  
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Ile Arg Arg Lys Phe Arg Ser Val Leu Gln Leu Arg Leu Gln Gln Arg  
15 20 25  
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Arg Thr Gln Glu Gln Leu Ala Asn Gln Gly Leu Ile Pro Pro Leu Lys  
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Thr Glu Asp Ser Leu Arg Arg Lys Gly Arg Asn Arg Ser Asp Arg Ala  
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Ser Leu Val Thr Met His Ile Leu Gln Ala Ser Thr Ala Glu Arg Ser  
80 85 90  
att cca act gct cag atg aag ctc aaa aga gcc cgc ctt gca gat gac 578  
Ile Pro Thr Ala Gln Met Lys Leu Lys Arg Ala Arg Leu Ala Asp Asp  
95 100 105  
ctc aat gag aag atc gct ctc cgc caa ggg ccc ttg gaa ctg gtg gag 626  
Leu Asn Glu Lys Ile Ala Leu Arg Gln Gly Pro Leu Glu Leu Val Glu  
110 115 120

aag aac att ctg ccg atg gat tct tcc gtg aaa gag gct ata aaa ggt	674
Lys Asn Ile Leu Pro Met Asp Ser Ser Val Lys Glu Ala Ile Lys Gly	
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Thr Glu Val Ser Leu Ser Lys Ala Ala Asp Ala Phe Ala Phe Glu Asp	
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Asp Ser Ser Arg Asp Gly Leu Ser Pro Asp Gln Ala Arg Ser Glu Asp	
160 165 170	
ccc cag ggc tct aca gga tcc acc cca gac atc aaa tcc act gag gct	818
Pro Gln Gly Ser Thr Gly Ser Thr Pro Asp Ile Lys Ser Thr Glu Ala	
175 180 185	
cct ctg gac aca atc cag gat ctc act cct ggc tca gaa agt gac aag	866
Pro Leu Asp Thr Ile Gln Asp Leu Thr Pro Gly Ser Glu Ser Asp Lys	
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Asn Asp Ala Ala Ser Gln Pro Gly Asn Gln Ser Asp Pro Gly Lys Gln	
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Val Leu Gly Pro Leu Ser Thr Pro Ile Pro Val His Thr Ala Val Lys	
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Ser Lys Ser Leu Gly Asp Ser Lys Asn Arg His Lys Lys Pro Lys Asp	
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Pro Lys Pro Lys Val Lys Lys Leu Lys Tyr His Gln Tyr Ile Pro Pro	
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Asp Gln Lys Ala Glu Lys Ser Pro Pro Pro Met Asp Ser Ala Tyr Ala	
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Arg Leu Leu Gln Gln Gln Gln Leu Phe Leu Gln Leu Gln Ile Leu Ser	
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Gln Gln Gln Gln Gln Arg Phe Ser Tyr Pro Gly Met His Gln Thr His	
320 325 330	

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Leu	Lys	Glu	Pro	Asn	Glu	Gln	Met	Ala	Arg	Asn	Pro	Asn	Pro	Ser	Ser	
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Thr	Pro	Leu	Ser	Asn	Thr	Pro	Leu	Ser	Pro	Val	Lys	Asn	Ser	Ile	Ser	
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Thr	Thr	Val	Thr	Phe	Pro	Val	Thr	Pro	Asn	Thr	Leu	Pro	Ser	Tyr	Gln	
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Ser	Ser	Pro	Thr	Gly	Phe	Tyr	His	Phe	Gly	Ser	Thr	Ser	Ser	Ser	Pro	
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ccc	atc	tcc	ccc	gcc	tca	tct	gac	ttg	tcc	gct	gca	ggg	tcc	ctg	cca	1682
Pro	Ile	Ser	Pro	Ala	Ser	Ser	Asp	Leu	Ser	Ala	Ala	Gly	Ser	Leu	Pro	
460				465					470					475		
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Asp	Thr	Phe	Thr	Asp	Ala	Ser	Pro	Gly	Phe	Gly	Leu	His	Ala	Ser	Pro	
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Val	Pro	Ala	Cys	Thr	Asp	Glu	Ser	Leu	Leu	Ser	Ser	Leu	Asn	Gly	Gly	
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Ser	Gly	Pro	Ser	Glu	Pro	Asp	Gly	Leu	Asp	Ser	Glu	Lys	Asp	Lys	Met	
	510					515						520				
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Leu	Val	Glu	Lys	Gln	Lys	Val	Ile	Asn	Gln	Leu	Thr	Trp	Lys	Leu	Arg	
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Gln	Glu	Gln	Arg	Gln	Val	Glu	Glu	Leu	Arg	Met	Gln	Leu	Gln	Lys	Gln		
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Lys	Ser	Ser	Cys	Ser	Asp	Gln	Lys	Pro	Leu	Pro	Phe	Leu	Ala	Thr	Thr		
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Ile	Lys	Gln	Glu	Asp	Val	Ser	Ser	Cys	Pro	Phe	Ala	Pro	Gln	Gln	Ala		
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Ser	Gly	Lys	Gly	Gln	Gly	His	Ser	Ser	Asp	Ser	Pro	Pro	Pro	Ala	Cys		
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Glu	Thr	Ala	Gln	Leu	Leu	Pro	His	Cys	Val	Glu	Ser	Ser	Gly	Gln	Thr		
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cat	gta	ctc	tcg	tcc	acg	ttt	ctc	agc	ccc	cag	tgc	tcc	cct	cag	cac	2162	
His	Val	Leu	Ser	Ser	Thr	Phe	Leu	Ser	Pro	Gln	Cys	Ser	Pro	Gln	His		
	620					625				630					635		
tcg	ccc	ctg	ggg	ggc	ctg	aag	agc	ccg	cag	cac	atc	agc	ctg	cct	cca	2210	
Ser	Pro	Leu	Gly	Gly	Leu	Lys	Ser	Pro	Gln	His	Ile	Ser	Leu	Pro	Pro		
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tca	ccc	aac	aac	cat	tac	ttc	ctg	gct	tcc	tct	tcg	gga	gct	cag	aga	2258	
Ser	Pro	Asn	Asn	His	Tyr	Phe	Leu	Ala	Ser	Ser	Ser	Gly	Ala	Gln	Arg		
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Glu	Asn	His	Gly	Val	Ser	Ser	Pro	Ser	Ser	Ser	Gln	Gly	Cys	Ala	Gln		
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Met	Thr	Gly	Leu	Gln	Ser	Ser	Asp	Lys	Val	Gly	Pro	Thr	Phe	Ser	Ile		
	685					690					695						
cca	tcc	cca	act	ttt	tct	aag	tca	agt	tca	gca	gtt	tca	gat	atc	acc	2402	
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Glu	Ser	Pro	Trp	Glu	Thr	Met	Glu	Trp	Leu	Asp	Leu	Thr	Pro	Pro	Ser
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Asn	Ile	Asp	Phe	Leu	Asp	Val	Thr	Asp	Leu	Asn	Leu	Asn	Ser	Pro	Met
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65					70					75					80
His	Ile	Leu	Gln	Ala	Ser	Thr	Ala	Glu	Arg	Ser	Ile	Pro	Thr	Ala	Gln

95

Thr Pro Leu Ser Pro Val Lys Asn Ser Ile Ser Gly Gln Thr Gly Val  
355 360 365

Ser	Ser	Leu	Lys	Pro	Gly	Pro	Leu	Pro	Pro	Asn	Leu	Asp	Asp	Leu	Lys	370	375	380	
Val	Ser	Glu	Leu	Arg	Gln	Gln	Leu	Arg	Ile	Arg	Gly	Leu	Pro	Val	Ser	385	390	395	400
Gly	Thr	Lys	Thr	Ala	Leu	Val	Asp	Arg	Leu	Arg	Pro	Phe	Gln	Asp	Cys	405	410	415	
Ala	Gly	Asn	Pro	Val	Pro	Asn	Phe	Gly	Asp	Ile	Thr	Thr	Val	Thr	Phe	420	425	430	
Pro	Val	Thr	Pro	Asn	Thr	Leu	Pro	Ser	Tyr	Gln	Ser	Ser	Pro	Thr	Gly	435	440	445	
Phe	Tyr	His	Phe	Gly	Ser	Thr	Ser	Ser	Ser	Pro	Pro	Ile	Ser	Pro	Ala	450	455	460	
Ser	Ser	Asp	Leu	Ser	Ala	Ala	Gly	Ser	Leu	Pro	Asp	Thr	Phe	Thr	Asp	465	470	475	480
Ala	Ser	Pro	Gly	Phe	Gly	Leu	His	Ala	Ser	Pro	Val	Pro	Ala	Cys	Thr	485	490	495	
Asp	Glu	Ser	Leu	Leu	Ser	Ser	Leu	Asn	Gly	Gly	Ser	Gly	Pro	Ser	Glu	500	505	510	
Pro	Asp	Gly	Leu	Asp	Ser	Glu	Lys	Asp	Lys	Met	Leu	Val	Glu	Lys	Gln	515	520	525	
Lys	Val	Ile	Asn	Gln	Leu	Thr	Trp	Lys	Leu	Arg	Gln	Glu	Gln	Arg	Gln	530	535	540	
Val	Glu	Glu	Leu	Arg	Met	Gln	Leu	Gln	Lys	Gln	Lys	Ser	Ser	Cys	Ser	545	550	555	560
Asp	Gln	Lys	Pro	Leu	Pro	Phe	Leu	Ala	Thr	Thr	Ile	Lys	Gln	Glu	Asp	565	570	575	
Val	Ser	Ser	Cys	Pro	Phe	Ala	Pro	Gln	Gln	Ala	Ser	Gly	Lys	Gly	Gln	580	585	590	
Gly	His	Ser	Ser	Asp	Ser	Pro	Pro	Pro	Ala	Cys	Glu	Thr	Ala	Gln	Leu	595	600	605	
Leu	Pro	His	Cys	Val	Glu	Ser	Ser	Gly	Gln	Thr	His	Val	Leu	Ser	Ser	610	615	620	
Thr	Phe	Leu	Ser	Pro	Gln	Cys	Ser	Pro	Gln	His	Ser	Pro	Leu	Gly	Gly	625	630	635	640
Leu	Lys	Ser	Pro	Gln	His	Ile	Ser	Leu	Pro	Pro	Ser	Pro	Asn	Asn	His	645	650	655	

Tyr	Phe	Leu	Ala	Ser	Ser	Ser	Gly	Ala	Gln	Arg	Glu	Asn	His	Gly	Val	660	665	670	
Ser	Ser	Pro	Ser	Ser	Ser	Gln	Gly	Cys	Ala	Gln	Met	Thr	Gly	Leu	Gln	675	680	685	
Ser	Ser	Asp	Lys	Val	Gly	Pro	Thr	Phe	Ser	Ile	Pro	Ser	Pro	Thr	Phe	690	695	700	
Ser	Lys	Ser	Ser	Ser	Ala	Val	Ser	Asp	Ile	Thr	Gln	Pro	Pro	Ser	Tyr	705	710	715	720
Glu	Asp	Ala	Val	Lys	Gln	Gln	Met	Thr	Arg	Ser	Gln	Gln	Met	Asp	Glu	725	730	735	
Leu	Leu	Asp	Val	Leu	Ile	Glu	Ser	Gly	Glu	Met	Pro	Ala	Asp	Ala	Arg	740	745	750	
Glu	Asp	His	Ser	Cys	Leu	Gln	Lys	Ile	Pro	Lys	Ile	Pro	Gly	Ser	Ser	755	760	765	
Cys	Ser	Pro	Thr	Ala	Ile	Pro	Pro	Lys	Pro	Ser	Ala	Ser	Phe	Glu	Gln	770	775	780	
Ala	Ser	Ser	Gly	Gly	Gln	Met	Ala	Phe	Asp	His	Tyr	Ala	Asn	Asp	Ser	785	790	795	800
Asp	Glu	His	Leu	Glu	Val	Leu	Leu	Asn	Ser	His	Ser	Pro	Ile	Gly	Lys	805	810	815	
Val	Ser	Asp	Val	Thr	Leu	Leu	Lys	Ile	Gly	Ser	Glu	Glu	Pro	Pro	Phe	820	825	830	
Asp	Ser	Ile	Met	Asp	Gly	Phe	Pro	Gly	Lys	Ala	Ala	Glu	Asp	Leu	Phe	835	840	845	
Ser	Ala	His	Glu	Leu	Leu	Pro	Gly	Pro	Leu	Ser	Pro	Met	His	Ala	Gln	850	855	860	
Leu	Ser	Pro	Pro	Ser	Val	Asp	Ser	Ser	Gly	Leu	Gln	Leu	Ser	Phe	Thr	865	870	875	880
Glu	Ser	Pro	Trp	Glu	Thr	Met	Glu	Trp	Leu	Asp	Leu	Thr	Pro	Pro	Ser	885	890	895	
Ser	Thr	Pro	Gly	Phe	Ser	Asn	Leu	Thr	Ser	Ser	Gly	Pro	Ser	Ile	Phe	900	905	910	
Asn	Ile	Asp	Phe	Leu	Asp	Val	Thr	Asp	Leu	Asn	Leu	Asn	Ser	Pro	Met	915	920	925	
Asp	Leu	His	Leu	Gln	Gln	Trp													



